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SPECIAL CABLE DISPATCH TO THE MEDICAL NEWS.

III.

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VIRCHOW ON THE INJURIOUS EFFECTS OF KOCH'S METHODS.

AT the Berlin Medical Society on January 7th, Professor Virchow exhibited specimens from twenty-one patients treated by Koch's method who died before January 1st. Since then six or seven more necropsies had been made by him and specimens from these were also shown. Of the former series, sixteen were cases of phthisis.

Professor Virchow illustrated the irritating effects of the fluid by the specimen of a brain removed from a child with tuberculous arachnitis, who died after four injections of the lymph amounting in all to two milligrammes. There was intense hyperæmia of the brain and pia mater such as Professor Virchow had never before seen. The vessels of the pia were extremely engorged and the brain-substance internally was of a dusky-red tint. The speaker could not see any signs of retrogressive metamorphosis of the tubercles. Acute hyperæmia and swelling were also seen in the internal organs of other cases. The walls of old cavities in the lungs showed unusual redness of the granulations and recent hæmorrhages. In one case hæmoptysis from an old cavity was the immediate cause of death.

Virchow says there can be no doubt that in internal organs acute inflammation and active proliferation are set up by injections of the fluid. These conditions are seen particularly in the edges of tuberculous ulcers and in neighboring lymphatic glands, especially the bronchial and mesenteric glands. These glands swell to quite an unusual extent and rapid proliferation of the cells in their interior takes place. The colorless elements of the blood are increased and a condition of leucocytosis is established. In the larynx, even when the surfaces of the ulcers become clean, swelling of the adjoining parts may be dangerously great. He showed a recent specimen in which erysipelatous-like œdema of the glottis and a retro-pharyngeal

phlegmon had been produced. The changes in the lungs consisted in caseous hepatization, of which an extreme example was shown.

This condition existed in five out of the sixteen cases of phthisis, associated with a special form of pneumonia, resembling the catarrhal type, but differing therefrom in the character of the secretion. The lungs in some places presented foci of softening, and even cavities, the result of acute inflammation caused by the injections of the lymph.

The *most important effect observed, however, was an eruption of fresh crops of tubercles after the injections.* This occurs especially in the pleura, pericardium, and peritoneum, and Virchow says that in the case of these serous membranes the statement that the substance of the tubercle is destroyed by the remedy is not confirmed by his examinations; he adds that if the effect of the remedy is to cause breaking down, the result would be to release the bacilli and give rise to new foci of tuberculous disease in other parts of the body by infection with the products of disintegration. Virchow, therefore, urges the greatest caution in the use of the remedy. While admitting that in many cases the lymph does produce the effects claimed for it, he points out that this result is not constant, and he cites cases in which large masses of tubercle were entirely unaffected by injections. He also showed specimens in which perforation of the intestines had been caused by the treatment, and one case of tuberculosis of the larynx in which fresh and extremely intense eruptions of tubercles had taken place throughout the whole extent of the larynx and trachea.

January 14th. Before the Berlin Medical Association to-day Prof. Virchow resumed his lecture on the subject of cases which have resulted fatally after the inoculations of the Koch remedy. He said that he was not prejudiced against the remedy; he simply wished to give warning regarding its too general application. In the discussion which followed, Professors Fränkel and Baginsky spoke in support of Professor Virchow's contention that tubercular disease was sometimes transferred to sound organs by inoculation. Numerous patients in Vienna, after reading the views expressed by Professor Virchow, declined to submit to further treatment by the Koch method.

ABSTRACT OF A THIRD COMMUNICATION ON A REMEDY FOR TUBERCULOSIS.[1]

BY PROFESSOR ROBERT KOCH.

As long as the only point of importance was to judge of the correctness of my statement it was not essential to know what the remedy contained and what its origin was. On the contrary, it was clear that subsequent experiments would be all the more unprejudiced if nothing was known of the remedy itself. I think the right moment has come to make the statements which follow.

If guinea-pigs be inoculated with a pure cultivation of tubercle bacilli the wound closes over with a sticky exudate. After ten to fourteen days a hard nodule presents itself, which, soon breaking, forms an ulcerating sore, which continues until the animal dies.

Quite a different condition of things occurs when a guinea-pig already suffering from tuberculosis is inoculated. An animal successfully inoculated from four to six weeks before is best adapted to this purpose. In such an animal the small indentation assumes the same sticky covering at the beginning, but no nodule forms. On the contrary, on the day following or the second day after the inoculation, the place where the lymph was injected shows a peculiar change taking place at the point of inoculation.

At the point of inoculation and for one centimetre around the tissues become hard and dark. During the next few days it becomes clear that the epidermis thus changed is necrotic; finally, it is thrown off, and a flat, ulcerated surface remains, which generally heals quickly and completely without carrying infection to the neighboring lymphatic glands. Thus the inoculated tubercle bacilli act quite differently on the skin of a healthy guinea-pig than on that of a tuberculous one, but this remarkable action does not belong exclusively to living tubercle bacilli, but also in the same degree to dead ones, whether killed by low temperatures of long duration, which I at first tried, or by boiling heat, or by certain chemicals. Pure cultivations of tubercle bacilli thus killed after they have been ground down and suspended in water, can be injected under the skin of healthy guinea-pigs in large quantities without producing anything but local suppuration.

Tuberculous guinea-pigs can be killed by injec-

[1] Deutsche medicinische Wochenschrift, January 15, 1891.

tions of very small quantities—a small dose producing widespread necrosis of the skin. If still more dilute the animals remain alive, and if the injections be continued at intervals of one or two days a noticeable improvement in their condition soon sets in. The ulcer at the point of inoculation becomes swollen and finally cicatrizes. This is never the case without such treatment. The swollen lymphatic glands become smaller and the condition, as regards nutrition, improves. Finally, the progress of the disease is arrested, if it is not already so far advanced that the animal dies of debility. The important thing to be done is to carry out the process which takes place within the body, outside of it also, and, if possible to extract and isolate the curative substance from the tubercle bacilli. This problem required much work and time before I at last succeeded by the help of a 40 to 50 per cent. solution of glycerin in extracting the active principle from the tubercle bacilli.

My further experiments on animals, and finally on human beings, were made with liquid thus obtained, and in this way also the liquid which I let other physicians have in order to repeat the experiments, was obtained. The remedy with which the new treatment of tuberculosis is carried out is, therefore, a glycerin extract of pure cultivations of tubercle bacilli. The constitution of the active principle can as yet be only a matter of conjecture.

It seems to me to be a derivative of albuminous bodies, and to be in close relation to them, but it does not belong to the group of so-called toxalbumins, as it can withstand high temperatures, and in the dialyzer passes quickly and easily through the membrane.

The quantity of active principle present in the extract is in all probability very small. I estimate it at a fraction of one per cent.; thus if my assumption be correct, we have to deal with a substance, the action of which on the tuberculous organism far surpasses that of the strongest drugs known.

[The paper concludes with speculations as to the mode of action of remedy in affected tissues.—ED.]

POSSIBILITY OF CHECKING THE TUBERCULAR PROCESS IN MAN BY THE AGENCY OF A METABOLIC PRODUCT OF THE TUBERCLE BACILLUS.

BY SAMUEL G. DIXON, M.D.

IN THE MEDICAL NEWS of October 19, 1889, I called attention to a morphological change of the tubercle bacillus which was different from any that I had previously seen. This change of form suggested to my mind a possible evolution of function, and I realized that it might mean either a greater or less degree of virulence. As a less degree of virulence would be desirable in order to increase the power of animal resistance to pathogenic organisms, I cultivated the bacilli in a number of tubes to the stage at which few or no ordinary rod-formed bacilli could be found in the cultures. When they had arrived at this state of life, I imbedded a mass of the bacilli and débris under the skin of a guinea-pig. The inoculation apparently set up a disturbance in the animal economy. There was a short febrile stage; the lymphatic glands became swollen and the guinea pig seemed to be quite sick. This condition, however, soon passed away and the animal apparently recovered. Immediately after this injection the animal seemed to resist the effects of virulent tubercle bacilli.

In working out the two hypotheses published on October 19, 1889, I became convinced that by treating a mass of tuberculous tissue containing the odd forms of bacilli with some powerful solvent, I might dissolve out a principle that when injected into the animal economy would change the chemical condition of the tissues and thereby prevent the growth of the tubercle bacilli that inhabited the tissues.

To accomplish this, I submitted the tubes containing these actual tuberculous bacillary growths to the action of ether, and also to a saturated solution of sodium chloride. The respective mixtures were then passed through a Pasteur filter without pressure. This active principle, when subcutaneously injected in tuberculous animals, caused a febrile reaction. The tissue in the immediate neighborhood of the tubercles becomes hyperæmic, and the symptoms manifested resemble those produced by the introduction of a portion of the original mass. They also resembled the symptoms said to be produced in tuberculous animals by the introduction of the Koch remedy into the circulation, as well as those produced by the liquid made by Dr. Craft, of Cleveland, Ohio.

A CONVENTION of American physicians interested in electro-therapeutics has been called to meet at the Academy of Medicine, No. 17 West 43d Street, New York, on January 22, 1891, at 11 A.M., for the purpose of organizing an American Electro-therapeutic Association.

MEDICAL PROGRESS.

The Treatment of Chronic Endometritis by Intra-uterine Applications of Boric Acid.—DR. ALEXANDER DUKE (*British Medical Journal*, December 20, 1890) has succeeded in curing a number of obstinate and previously-intractable cases of endometritis by applying pure boric acid to the endometrium. The powder is applied by means of a somewhat curved hard-rubber tube, slightly larger than a No. 12 catheter, and fitted with a piston of the same material. About two inches of the distal end of the tube is charged by plunging it into a deep bottle containing the acid, the piston being withdrawn. The cervical canal is then freed from secretion, the point of the tube is inserted into the uterus, and the acid deposited in the cavity by pushing the piston home. The vaginal walls should be dusted with the powder at the same time. The applications should be repeated at intervals of three or four days.

Treatment of Dandruff.—DR. EDWARD CLARKE (*Lancet*, December 27, 1890) describes the following method of treating persistent dandruff. The method is that practised by Dr. Shudham, and has given excellent results. The head should be well washed with hot water and alcohol soap (pure soft soap, 2 ounces; alcohol, ½ ounce; oil of lavender, 10 minims). The soap is then washed away with hot water, and the scalp thoroughly dried by means of a warm soft cloth. Glycerole of tannin of a strength of from ten to thirty grains to an ounce, according to the obstinacy of the case, should then be well rubbed into the scalp. If tannin fails, resorcin may be used in its place. This process should be repeated once or twice a week. After the dandruff has disappeared the scalp should be rubbed daily with olive oil, containing in each case ten grains of carbolic acid and one drachm of oil of cinnamon.

Treatment of Goitre by Galvano-puncture.—DR. JAMES HENDRIE LLOYD (*University Medical Magazine*, December, 1890) reports four cases of follicular goitre treated by galvano-puncture. The first case was of several years' duration in a woman sixty years old, and was cured by fourteen punctures, each sitting lasting about twenty minutes and the current strength averaging between fourteen and eighteen milliampères. During each application the gland tissue became swollen around the needles, sensitive to pressure, and gas, probably hydrogen, crepitated from within and escaped from the punctures. The surrounding skin was reddened and occasionally the points of puncture were distinctly burned because of defective insulation. For a day or two after the operation the gland would be very sore and on several occasions threatened to suppurate, but this it never did.

The second case was that of a young woman in whom a goitre had been present for about eighteen months. Punctures were made at intervals of a week "for a long while," the current-strength varying from fourteen to twenty milliampères. On one occasion severe inflammation of the gland and of the skin for some distance downward followed. When treatment was stopped the gland was shrunken, hard and gristly, and has remained so for three years.

The third case was not so satisfactory, partly at least because the goitre was an enormous one of many years' standing, bulging on each side and reaching almost to the ears. Very large veins ran over the surface and through the gland structure. The patient discontinued her visits before the results of treatment could be determined.

The fourth case declined to submit to treatment after the first application of the needles.

The apparatus used for the punctures consisted of three small gold-plated needles insulated to within one-third of an inch of the point. These were connected by a branching cord, so that all could be attached to the negative pole of the battery. The method of operating was as follows: The needles were inserted into the tumor far enough to protect the skin by the insulating material, care being taken to avoid veins. The positive pole was connected with a large, flat, sponge electrode. Thus resistance was reduced as much as possible and a strong current made possible without too much pain. But even with this precaution the skin under the sponge became at times much reddened, and in one instance blisters formed. An accurate milliampèremeter was kept in the circuit and constantly observed, and a water rheostat was used to avoid shocks.

Longevity Among the California Indians.—Dr. Remondino, of San Diego, recently addressed the California State Medical Society regarding the longevity of some of the Indians of Southern California, and although his statements are extraordinary, they are of interest. He states that he has obtained strong evidence that not a few of the Indians pass the age of one hundred years. The Indian village at Capitan Grande contains several women more than one hundred and thirty years old. Dr. Remondino quotes a statement of Dr. Edward Palmer, who for a long time was associated with the Smithsonian Institution, that there lived in Southern California a squaw who was one hundred and twenty-five years old, and that he has seen her carry, tied up in a blanket, six melons for the distance of two miles. Near San Diego there lives an Indian who though bent, wrinkled, blind, and reputed to be one hundred and forty years old, is still quite active and daily makes his way to the beach and along the bed of the creek to search for drift-wood. There is another Indian whose age is believed to be not less than one hundred and fifteen years, who is remarkably active and a great walker, an ordinary journey for him being a walk of fifty miles. Father Ulbach, a missionary well acquainted with the habits of the Indians, says that a more temperate and abstemious class of people does not exist, their diet being almost solely of acorns, flour and water.

Climate is undoubtedly a factor in the production of these long years of activity. Malarial diseases and rheumatism are unknown among the original occupiers of the soil, no land is more free from lung affections, and renal and hepatic disorders are seldom met with.

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ORIGINAL LECTURES.

DIGESTION, ASSIMILATION, AND OXIDATION—THEIR NORMAL AND ABNORMAL CONDITIONS IN RELATION TO HEALTH AND DISEASE.

A Series of Clinical Lectures, delivered at the New York Post-Graduate Medical School and Hospital.

BY WILLIAM HENRY PORTER, M.D.,
PROFESSOR OF CLINICAL MEDICINE AND PATHOLOGY.

LECTURE II.

GENTLEMEN: To-day I show you a case which illustrates more particularly primary gastric indigestion.

Mrs. M. E., aged thirty-five years. Up to ten days ago the patient considered herself perfectly well, when she commenced to have pain and distress in the epigastric region immediately after eating, frequently followed by vomiting of a greenish and acid-tasting fluid. Pyrosis occurs immediately after each meal. Her appetite is capricious; bowels irregular; she has some headache and vertigo; her tongue is large, pale and flabby, and shows distinctly imprints of the teeth. Her pulse is weak, the heart's action slow and feeble, the first sound of the heart being faint and somewhat prolonged. In this case remedies addressed chiefly to the stomach have relieved the more active symptoms. The appearance, however, of the tongue; the condition of the heart; the tendency to headache and vertigo, and the irregular condition of the bowels show quite conclusively that underlying or behind these active gastric symptoms we have grave intestinal and hepatic disturbances which must be overcome if we wish to place our patient in the best possible nutritive condition and prevent a recurrence of the more active gastric disturbances.

At our last lecture we considered the changes wrought upon the food-stuffs while in the stomach, and we are now ready to begin with the changes effected after leaving the pyloric outlet and entering the intestines.

The *first* digestive fluid which gains access to the food-stuffs in the intestinal canal is that secreted by Brunner's glands. These glands, from ten to twenty in number, are situated for the most part in the upper portion of the duodenum, above the entrance of the ductus communis choledochcus and pancreatic duct, and but few are found below these openings. They seem to partake of the characteristics of compound racemose and of compound follicular glands. Their secretion is, comparatively speaking, small in quantity and has not as yet been obtained in sufficiently large amounts to give absolute and positive evidence as to its chemical composition and action, but so far as is known it is strongly alkaline, and thereby helps to reduce the acidity of the food-stuffs as they pass into the intestines. It is also said to contain a ferment which has for its physiological action the liquefaction of proteid substances and their conversion into a diffusible peptone.

The *second* or diastatic ferment converts starch into sugar or glucose, and is said to be the most active of all the sugar-forming ferments found in the animal economy. This assertion, however, must be taken with some reservation on account of the difficulty met with in securing the fluid from these glands. As the result of the action of these ferments a certain amount of the proteids and sugars is converted into diffusible substances, which reduces the amount of work to be performed by the pancreatic and intestinal ferments proper.

The next digestive fluids with which the food comes in contact are those secreted by the pancreas and liver, and for convenience we will first consider the former. The quantity of pancreatic juice secreted in twenty-four hours is about 800 grammes, or twenty-five ounces. It has a very strong alkaline reaction due to the large amount of carbonate of sodium that it contains, which tends to transform rapidly the acid chyme into an alkaline fluid, to convert the proteids into an alkaline albumin, and to place all the food-stuffs in a proper condition to be acted upon by its contained ferments. The pancreatic fluid, as is seen by our table,[1] is credited with containing four well-defined ferments, and one of questionable existence. This questionable ferment is rather the result of the steapsin plus the alkalinity of the pancreatic fluid, which produces emulsification, than a separate ferment.

First, the diastatic or amyloptic ferment has for its physiological function the property of converting all forms of starch, both in the cooked or hydrated state, and in the raw condition into glucose, and in intensity of action it is said to stand second only to the diastatic ferment secreted by Brunner's glands. It is by this diastatic action of the pancreatic fluid that the major part of our glucose is formed from the starches.

The *second*, or tryptic ferment, is a powerfully-erosive agent attacking alkaline albumin in an alkaline medium and converting it first into propeptone, then into albumoses, and finally into a true and diffusible peptone. In this action the proteids do not swell up, gelatinize, and finally become peptones, as in the stomach when acted upon by the pepsin, but the solid proteids are eaten away or eroded, molecule by molecule, until they are finally transformed. In this respect it differs from the peptic action and is very much more powerful, and converts a larger quantity of the proteid substances into peptones. Synchronous with this action numerous by-products are formed, but which have, as yet, become of no practical value.

The *third*, or milk-curdling ferment, attacks the milk which may have passed through the stomach unaffected by the milk-curdling ferment of the gastric secretion, transforming it into a semi-solid and flaky casein to be

[1] See Lecture I.

attacked by the tryptic ferment and converted into a diffusible peptone.

Fourth, the fat-splitting or steaptic ferment is the one by which the various forms of fat are split up into their component parts—fatty acid and glycerin—the former by the further action of the ferment being joined to the sodium bicarbonate of the pancreatic juice, and finally resulting in the formation of a hard soap.

The *fifth* ferment, emulsin, which is questionable, is probably not a ferment, but the emulsifying action of the pancreatic juice is probably due to the combined action of the strong alkalinity of this fluid and the steapsin, on the fats, by which the latter are most perfectly emulsified and placed in a condition in which the epithelial cells can seize upon the minute particles of fat, draw them into the cell-protoplasm and discharge them into the lacteals. This absorption by the epithelium is easily demonstrated under the microscope.

It seems to me quite reasonable to suppose that the protoplasmic substance composing the epithelial cells lining the alimentary tract has for one of its vital properties the power to draw into itself the soluble and diffusible proteids, glucose and salts, and to discharge them into the venous capillaries of the entero-hepatic circulation, and that by this channel they reach the liver. As the proteids, sugars, etc., are in the liquid state we cannot follow the transit through the cells as we can the fatty particles, but reasoning by analogy we may assume that the process occurs. That they do pass to the liver is unquestioned.

The intestinal secretion by this method of tabular arrangement is narrowed down to that fluid which is secreted by the simple follicles and the glands of Lieberkühn. It is, however, from the latter class that the active ingredients or ferments originate. The succus entericus, as you will readily see by referring to our table,[1] is a limited secretion, but still one which in itself contains four active principles.

The *first*, or diastatic ferment, differs from those already described in that it does not form maltose, but converts maltose into glucose, completing, as it were, the diastatic action of the ptyalin and amylopsin. Its action is secondary and somewhat limited.

The *second*, or proteolytic ferment, has for its function the property of converting fibrin into a peptone. The origin of this ferment in the glands of Lieberkühn appears to be somewhat in doubt, being traced by some to Brunner's glands. That such an action is effected by the compound juices of the intestines there seems to be little if any doubt.

The *third* ferment, or invertin, is probably the most important of all the ferments of the succus entericus. Most of the sugar which we take as food is, as you know, in the form of cane-sugar and not glucose, and practically speaking little or no glucose is taken with the ordinary food-stuffs. Another noticeable fact is that few physiologists give us any information regarding the fate of the cane-sugar after it has passed the œsophagus. We are taught that it cannot pass into the blood in its original form, but we are not told that it passes as sugar from the anus; consequently what becomes of the large amount of cane-sugar ingested daily was formerly a doubtful question in my mind. But the question is now clearly and satisfactorily explained by this inverting-ferment which changes the cane-sugar into an absorbable glucose.

A *fourth*, or milk-curdling ferment, is also spoken of in connection with the intestinal fluid. Whether this is a direct product of the intestinal glands, or originates from some of the other secretory glands already described, is an undecided question. There seems to be, however, no doubt that when the succus entericus is added to fluid milk it precipitates the caseine, and that if any milk reaches the intestine in a fluid state the caseine is there precipitated and placed in a favorable condition to be acted upon by the peptonizing ferments and converted into a diffusible peptone.

We now come to the study of the most interesting of the digestive fluids, and the one which is least accurately understood, namely, the bile. If viewed from our combined physiological knowledge, and that derived from close clinical observation, we are enabled to speak with a much greater degree of accuracy than can be obtained in any other way. Experimentally, it is almost impossible to prove positively the action of the biliary fluid, for the moment a biliary fistula is established and the bile turned from its natural channel, all the functions of the body are so thoroughly disturbed that the most contradictory evidence is obtained. Nevertheless, the knowledge derived in this way, together with clinical and pathological observations, has enabled us to formulate the following actions of the bile. The ordinary physical and chemical properties need not be considered in detail, as it is the physiological actions which concern us most. These actions are quite numerous and not necessarily due to contained ferments.

First: It has an emulsionizing action, that is, it acts upon neutral fats and minutely subdivides the oil-globules so that they can be easily taken up by the epithelial cells and discharged into the lacteals. It does not appear to have the property of splitting fats into their component parts—a fatty acid and glycerin—but when freely mingled with the biliary fluid, the fat is placed in such a condition that the steapsin of the pancreatic fluid can more easily separate it into a fatty acid and glycerin, and form a soap by the union of the soda and fatty acid.

Second: The bile contains a diastatic ferment which has for its action the conversion of starch and glycogen into glucose.

Third: Taken as a whole, the bile may be regarded as a stimulant, producing peristalsis of the intestines, thus tending to favor absorption and prevent constipation.

Fourth: The bile-acids in particular are stimulants to the small muscles contained in the villi, so that by the contraction of these muscles the contents of the lymph-spaces are emptied toward the larger and deeper lymphatics, leaving those in the villi empty and in a position to absorb more. Regarded in this light the lymph-sacs of the villi are little pumps which are constantly pumping the fat out of the epithelial cells and discharging it into the deeper lacteals to be passed on to the general circulation.

Fifth: The moistening of the epithelial cells with bile seems to be necessary for their vital activity, enabling

[1] THE MEDICAL NEWS, January 10, 1891, p. 31.

them to take up both glucose and peptones much more rapidly than is the case when they are deprived of a free supply of bile. The bile seems also to stimulate a watery flow from the intestinal follicles, which together with its tendency to excite peristalsis favors a free and easy passage of the intestinal contents into and through the colon. By some the bile is spoken of as a lubricant to the colon, which combined with the other effects, favors free movements and prevents constipation.

Sixth: The biliary fluid prevents decomposition in the alimentary tract and may be looked upon as Nature's chief antiseptic. This assertion is sustained by the rapidity with which decomposition occurs whenever the biliary secretion is impaired, totally arrested, or changed in quality. Under these circumstances we notice at once a tendency to persistent constipation, clay-colored stools and the distention of the intestines with gas. If the quantity of bile is abundant, but of poor quality, there is a tendency to black, tarry, and burning stools, with some tympanites, and fermentation and incomplete digestion of the food-stuffs.

Seventh: I think we are justified in assuming that the bile and its contained ingredients aid very materially in the final solution of the albuminoids, and their conversion into diffusible peptones. This view is entertained after a careful clinical study of a large number of cases which has clearly shown that unless the old bile and that of poor quality be expelled from the system, and its place taken by new bile, and that of a better quality, the digestive disturbances cannot be overcome; but that so soon as this change is effected digestion and assimilation become perfect and nutrition is carried on normally. This is conclusively proved by the fact that the products of oxidation found in the urine rapidly change from an excess of uric acid, oxalates, and urates, to urea, carbonic acid, and water.

Having by the action of these various fluids and ferments placed our food-stuffs in a condition in which they can be removed from the alimentary canal, we find the fats going by the way of the lymphatics and thoracic duct to the vascular channel, and thence poured into the blood-current at the junction of the left internal jugular and subclavian vein. From here they pass as fats through the left bronchio-cephalic and superior vena cava to the right auricle on to the right ventricle, and through the pulmonary arteries to the lungs. In the lungs the fat in its original form appears to be acted upon by the oxygen and changed, so that it can no longer be recognized as such in the blood. It yields in its various transformations, heat and energy to the system, lubricates and protects various parts of the body, and is finally eliminated as carbonic acid and water. The sugars and peptones pass by the entero-hepatic or portal system of vessels directly to the liver, where they are variously changed by the hepatic cells and distributed to various parts of the body.

The changes wrought upon the glucose, peptones, etc., are perhaps best discussed under the action of the liver, and may be considered under seven headings:

First: The so-called glycogenic function or action. When speaking of this function it is commonly asserted that the hepatic cells have the property of attacking the glucose, changing it into glycogen, and storing it, then changing it back into glucose to be finally lost in the system and oxidized into carbonic acid and water. This storage-house action of the liver I have never been able to comprehend, for the simple reason, that in experiments, unless the liver is abstracted with lightning-like rapidity, all the glycogen has vanished. My idea of a storage-house has been of a much less transitory or visionary nature. It has always seemed to me that there was no storing-up of glycogen, but rather that the glucose is converted into antecedent products of incomplete oxidation, varying in kind and quantity, but ultimately being oxidized into carbonic acid and water. That occasionally, and perhaps always, glycogen in varying quantities is one of these antecedent products and has been more frequently or is more easily obtained than any of the others, has led to its being looked upon as a stored-up product. Much, however, of the glycogen produced in the system is probably developed from the nitrogenous products, and when oxidation is incomplete it passes as glycogen, or in some other form of antecedent product, to the kidneys, where it is seized by the renal cells and discharged into the uriniferous tubules, giving rise to the condition known as diabetes mellitus.

Second: The liver has its bile-secreting function; that is to say, the hepatic cells produce and discharge into the minute biliary ducts a complex fluid of neutral reaction, which flows on into the larger hepatic ducts, where it is joined by the fluid from the gall-bladder. The function of the gall-bladder is to store up any superfluous production of bile during the interval of digestion. That which accumulates in the gall-bladder contains a varying quantity of alkaline mucus, so that the bile which flows into the duodenum is a thick, tenacious, and somewhat alkaline fluid, while that secreted directly from the hepatic cells is a thinner, more watery, neutral fluid. Having reached the intestinal tract it produces the effects we have already gone over in connection with the functions of the bile as a whole.

Third: The liver is spoken of as having a bile-excreting function—that is, the hepatic cells seem to have the power to attack certain medicinal and other substances which reach the liver through the entero-hepatic circulation, and act upon these poisons in such a way that they are prevented from passing into the general circulation, and are discharged into the minute biliary ducts. From there they pass to the intestines, and, finally, out of the body with the fæces. In this way the system is protected from the poisonous effects which would occur if such substances passed at once and rapidly into the general circulation.

Fourth: The peptone-destroying action of the hepatic cells is somewhat similar to the action just described, in that it destroys the peptone which is now regarded as a ptomaïne and a deadly poison if permitted to reach the general circulation and nerve-cells in an unchanged form. This action differs from the one just described in that the peptone is not excreted from the system with the bile, but is transformed into another, and unquestionably inert, form of albumin. This assertion is sustained by the fact that the portal blood contains a large percentage of peptone, while in the blood of the hepatic vessels we find no peptones, but an increased amount of serum-albumin and globulin. If, however, for any reason this peptone-transforming power is impeded or arrested, and the peptones are permitted to gain access

to the general circulation, symptoms of poisoning are developed in proportion to the amount and rapidity with which the ptomaïnes reach the general system, and also the rapidity with which the excretory organs can expel them from the body. If the quantity discharged into the general system be small and almost as rapidly excreted, the only abnormal symptoms may be a little lassitude, headache, drowsiness, loss of appetite, and high-colored urine. If, on the other hand, they pass into the circulation very rapidly and are eliminated slowly, the symptoms will be more intense; the headache may give place to marked delirium; drowsiness to coma, with nausea and vomiting, constipation or diarrhœa, and scanty and high-colored urine, until, finally, the case terminates in death, with symptoms simulating uræmic or toxæmic poisoning. I believe that all of that host of vague and often ill-defined "bilious" and "neurasthenic" symptoms are best explained by the passage into the general circulation and the incomplete elimination from the body of an almost innumerable number of ptomaïnes and leucomaïnes—products of incomplete nitrogenous oxidation. These poisonous elements circulating in the blood act differently upon various parts of the nervous system and functions of the body, and afford the most rational, comprehensive, and conclusive explanation of an almost innumerable variety of symptoms, sometimes vague and sometimes definite, which are often classed as neurological, but which can be dispersed only by correcting the digestive and hepatic functions. This view is also largely sustained by the known fact that, between serum-albumin as introduced into the body, and its most complete form of oxidation—urea, twenty-eight nitrogenous compounds have already been discovered, and traced into the urine, some of which are deadly poisons. How many there may be yet undiscovered it is hard to imagine, but in time probably many more will be revealed which will make many things that are now but vaguely surmised, actual and thoroughly-demonstrated facts.

Fifth: The liver or hepatic cells are furthur spoken of as having a general ptomaïne- or leucomïane-destroying power besides the peptone-decomposing; that is, they attack all forms of nitrogenous, alkaloidal, and basic substances which may be taken up with the food-stuffs by the entero-hepatic circulation, and convert them, like peptones, into inert substances that can be further utilized for the benefit of the system, or else discharge them with the excreted bile, to be passed out of the system with the fæces. The nitrogenous, basic, and alkaloidal substances developed in the system are probably acted upon in like manner and prepared for excretion. This transformation of ptomaïnes, leucomaïnes, and other poisons by this hepatic action, with the general disturbances in the hepatic functions and in the oxidation processes of the body, together with the general irritation of the increased effete material which is not eliminated from the system as rapidly as it is formed, has always appeared to me to be the true source of our increased bodily heat in disease. All antipyretics, unless they tend to retard these complex and abnormal processes, and bring about in their place normal phenomena, make the condition worse rather than improve the abnormal physiological state. If we can find an antipyretic that will prevent the introduction into, or the development of these poisons within the system, improve the functional chemico-physiological action of the hepatic cells, improve general nutrition, decrease the amount of effete excretory material circulating in the blood, and stimulate the excretory organs to greater activity, then we shall have a true antipyretic. At present, however, no such substance has been found, and it is doubtful if it ever will be. By the judicious administration of various substances we can, in a great measure, modify and overcome this complex problem, and, by so doing, we can very materially reduce the intensity of all infectious diseases and lower their mortality.

Sixth: The hepatic cells are thought by some to have the power to absorb and digest microörganisms—what is known as the phagocytic action. This theory, however, is not so well substantiated as those we have already discussed, but it is quite within the range of possibility that such an action is effected by the hepatic cells. If the microörganisms are not supplied to the liver in too large quantities, they are destroyed by this phagocytic property of the hepatic cells and the system preserved from damage by their presence. If, however, they are carried to the liver in large quantities, this phagocytic function is worn out or overcome, and the system at large succumbs to the influence of the microorganism. The destruction of the germs, however, is more generally attributed to the specific condition or the reaction of the fluids of the body, and not to the digestive action of the protoplasmic masses; at the same time, this protoplasmic destruction of microörganisms, especially in the liver, is in keeping with many of its other chemico-physiological actions, which gives us reason to think that in time we may have more proof of this theory. At any rate, we must go back to the hepatic cells for the chemico-vitalizing action upon the blood and through it to all the other fluids of the body.

Seventh: Although this is not included in our table, the liver may be very justly credited with the function of attacking all the food-stuffs and preparing them by the chemico-physiological action of its contained hepatic cells for general distribution throughout the system to sustain the growth, development, and vital actions of the body. Having served their purpose, all the products of tissue-waste come back to the liver as excrementitious substances, there to be acted upon again by the hepatic cells and transformed into antecedent products for final conversion and elimination from the body by the vital action of the various excretory organs, under the form of complete excrementitious substances, such as urea, kreatinine, uric acid, carbonic acid, and water. This action of the hepatic cells may be compared to that of the postal clerks of a large central office, who sort all the mail that comes into the office and start it upon its way, both to the nearest and to the most remote parts of the world. After reaching its destination, it comes back in the form of a reply to the same central postoffice, there to be re-sorted and again sent to its final destination. The mail represents the food-stuffs as they pass through the liver and on to the various parts of the body, as nutriment, and return again to the liver as excrementitious substances. In the liver, as in the post-office, one set of hepatic cells may attack and transform the food-stuffs for distribution throughout the body, while another set may attack the returning excrementi-

tious products and distribute them to their proper organs for elimination. Each individual cell, however, like each individual postal clerk, may be capable of performing both kinds of work, but, for certainty of action and quickness of dispatch, a given kind of work is assigned to a certain set of cells or clerks, yet all are contained within the same walls. The material to be acted upon in each case comes in and goes out through the same channels or doors. Considered in this light, I think we have a far more comprehensive idea of the amount of work, and of the method of its performance, that can be accomplished by the many millions of hepatic cells. We realize at a glance, as it were, the great importance of the liver; we see how a disturbance of its functional activity must disturb the accuracy of action throughout the whole animal economy and give rise to a great variety of symptoms.

Having reviewed the chemico-physiological action of digestion in this complete and continuous manner, I think that you all can accurately appreciate where the major part of the work is accomplished. You now see that the stomach has comparatively little work to do; that very much the larger part of what may be classed as purely digestive and preparatory to absorption is performed in the intestinal canal. Here we find that for the complete accomplishment of this part of the work, and the ready absorption of the liquefied and diffusible products, we are dependent upon the proper quantity and quality of biliary fluid. For this reason I have for a long time been accustomed to look upon this disturbance in the bile-producing function as one of the chief, if not the chief factor, in all forms of digestive difficulties. As we reach the liver, we find much work to be done there, which if imperfectly performed places the entire animal economy in an abnormal condition.

From a careful study of these physiological facts and close clinical observation, I have come to the conclusion that a pure and simple gastric "dyspepsia" is an exceedingly rare occurrence; that in the vast majority of cases the greater part of the trouble originates in the intestines and liver; and that when we do have gastric symptoms they are due to local causes acting upon a poorly-nourished gastric mucous membrane. The truth of these statements is quite perfectly illustrated by our patient to-day.

In my next lecture I will take up the symptoms a little more concisely, together with the treatment of these all-important cases.

ORIGINAL ARTICLES.

HYPERTROPHY OF THE TONSILS.[1]

BY T. HILLIARD WOOD, M.D.,
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HYPERTROPHY of the tonsils has occurred at all times with sufficient frequency to claim the serious consideration of surgeons, but the treatment adopted for its relief has been subject to many variations.

The mucous membrane covering the tonsil presents the openings of from twelve to fifteen follicles, the function of which is to secrete a fluid that lubricate the bolus of food in deglutition. These follicles penetrate into the tonsils and terminate in blind extremities. Surrounding the cæcal extremities of the follicles is a quantity of adenoid tissue, and in this adenoid tissue we have, as a rule, the beginning of the tonsillar hypertrophy. The arteries supplying the tonsils, though numerous, are not large, and would not, therefore, if cut, cause troublesome bleeding.

The causes giving rise to hypertrophy of the tonsils may be divided into predisposing and exciting. Of the predisposing influences few are so potent as age. Hypertrophy of the tonsils is essentially a disease of children and young adults. Although rarely congenital, it is frequently observed in the earlier years of life, but more often between the fifth and twentieth years. Not more than one case in ten is older than thirty years, and beyond the fortieth year it is rarely observed. All writers agree that among the predisposing causes a cachectic state, particularly that due to struma, is prominent. Sex also has its influence, for hypertrophy occurs about twice as often in males as in females.

Among the exciting causes may be mentioned acute tonsillitis, pharyngitis, and obstruction of the posterior nares, as by a polypus. Syphilis, either congenital or acquired, may produce chronic inflammation and enlargement of the tonsils. The hypertrophy may arise from diphtheria, scarlatina, measles or smallpox, and difficult dentition, as occurs in cutting a wisdom-tooth, may also cause it.

The enlargement may be seen at once by depressing the tongue and looking into the fauces. The degree of hypertrophy varies in different cases, from the slightest increase to the size of a guinea-hen's egg, when the tonsils may almost meet in the median line. The hypertrophy, though generally affecting both tonsils, is usually greater on one side than on the other. The enlarged tonsil produces the feeling of a foreign body in the throat, and consequently a desire to swallow.

The effect of the enlargement on the features is well illustrated by Mackenzie, who says: "We often predicate the existence of enlarged tonsils as the child, with open mouth, drooping eyelids, dull expression, and thick voice enters the consultation-room." Slight enlargement of the tonsils seems compatible with good health, as the affection is often not noticed by the patient until the overgrowth mechanically interferes with the functions of the pharynx.

The enlargement causes narrowing of the pharynx with difficult inspiration and expiration, the inspiration being the more embarrassed. This obstruction to inspiration necessitates an extra exertion of the diaphragm, and the constant and increased traction of the diaphragm on the thoracic walls

[1] Read before the Tri-State Medical Association, October 15, 1890, held in Chattanooga, Tenn.

causes narrowing and constriction of the chest corresponding to the attachment of the muscle. This "pigeon breast" is best developed when the tonsillar enlargement occurs in young people in whom the osseo-cartilaginous framework of the thorax is soft and yielding.

The enlarged tonsil, by filling up the pharynx and obstructing free nasal respiration, causes the patient to breathe through the mouth, both when awake and during sleep. The current of air through the nose being thus diminished, the nasal secretions are not dried up and blown out as in health, but remain to decompose and set up inveterate nasal catarrh.

Again, the enlarged tonsil is a frequent cause of impaired hearing. According to some, this result is brought about by the organs pressing upon the opening of the Eustachian tube, and so interfering with the ventilation of the middle ear. Another explanation, which is more probably the correct one, is, that the weight and traction of the tonsil produce patulency of the Eustachian tube, the inflammation of the nasal mucous membrane extending through the tube and causing the deafness. The movements of the soft palate and pharynx being interfered with, the voice is altered in tone, becoming thick and guttural. Sleeping with the mouth open, snoring, and awakening to find the mouth and pharynx dry, are frequent symptoms of enlarged tonsils.

The obstruction to deglutition, though less harmful than the obstruction to respiration, interferes with nutrition. Thus the patient, if a child, grows up in bad health caused by a diminished supply of oxygen and food. Perversion of the sense of smell, probably due to the accompanying catarrh, not infrequently occurs with hypertrophied tonsils. Frequent attacks of acute tonsillitis, upon slight exposure to cold, are often observed.

Most cases of enlarged tonsils have their origin in some acute inflammation of the glands previously mentioned. The lymphoid tissue of the tonsil is probably causative in maintaining the hyperæmia, until the stage of hypertrophy is developed. Enlargement of the tonsil is a true hypertrophy, an increase in the amount of each constituent element. The epithelial layer over the tonsil is thickened, and the mucous layer is infiltrated with lymphoid cells and new tissue-elements. But the great increase in the size of the organ is due to the development of connective tissue.

Enlarged tonsils do not directly threaten life, although some isolated cases of death from suffocation are on record. If left to themselves, the new tissue will, in time, undergo contraction, and by the age of thirty years, or soon after, the hypertrophied gland will have returned to a small size. But although all cases tend to spontaneous cure, they produce discomfort, retard the growth and development of the child, and during inflammatory affections of the air-passages become directly dangerous to life. For these reasons they should receive prompt and efficient treatment.

The treatment for the reduction of enlarged tonsils is divided by Mackenzie into local, constitutional, and operative.

Local treatment.—If the enlargement be due to swelling of the mucous membrane, or to engorgement and congestion of the tonsil, the application of astringents may be of service. The most useful local remedies are the subsulphate and perchloride of iron, in a strength of from one to eight parts in water or glycerin, and alum or tannin in powder. But where there is real overgrowth, the remedy, as Mackenzie observes, must be of a destructive character, and escharotics must be used. Among escharotics, "London paste" is useful and should be applied once or twice a week. This will produce a slough, and repeated applications will reduce the gland to a normal size. The treatment with escharotics, while effectual in the end, is quite tedious and painful. When for any reason excision cannot be performed, Donaldson, of Baltimore, incises the tonsil, and inserts into each incision a crystal of chromic acid.

Constitutional measures to effect reduction of the tonsils include such remedies as iodide of potassium, cod-liver oil, and the general tonics, to combat the diathesis upon which the enlargement often depends.

Operative treatment. — Although the writer has used most of the foregoing remedies in many cases, he has not yet derived from any of them decided reduction of the enlarged gland. This reduction can usually be brought about only by the use of some of the operations devised for that purpose. The operation of excision of the tonsil is a very old one, having been clearly described by Celsus during the days of Christ. Since then the popularity of the operation, as a surgical procedure, has been subject to much fluctuation, being at times highly recommended, and at other times condemned. The arguments against it were the difficulty of performance and the danger of hæmorrhage. In 1757, however, Caqué proved that the dread of hæmorrhage had been much overrated, and that the resulting wound readily healed. From that time the operation has grown in favor, and the methods of its performance have been numerous, almost every operator varying the procedure.

Of all the operations, excision by the tonsillotome is most popular, although many surgeons, among them the writer, prefer the bistoury and vulsellum forceps. The operation is rendered painless by

applying to the tonsil a solution of cocaine, and by injecting with a hypodermic syringe a few drops of the same solution into the substance of the gland. The cocaine also checks hæmorrhage. As a rule, general anæsthetics should not be used.

The only danger of tonsillotomy is the very slight one of hæmorrhage, and this has been held by conservative men as sufficient to condemn the operation. Let us examine into the matter of hæmorrhage after tonsillotomy. Sajous says: "Profuse hæmorrhage occurs in perhaps one out of every five hundred operations, while an alarming flow does not occur in one out of a thousand." Mackenzie, during a long experience, can recall only one case in which hæmorrhage seemed to endanger life. The records in the Surgeon-General's Office at Washington, D. C., for the past twenty-five years, show only two deaths from hæmorrhage after tonsillotomy, and in one of these, a child eight years old, the cause was an anomalous course of the internal carotid. In the other case the patient was twenty-five years of age.

Statistics show, however, that free bleeding occurs in about one per cent. of cases, and in one thousand operations collected by J. Solis-Cohen there were four deaths. But while the danger from hæmorrhage in children, in whom the tonsillar tissue is loose, and therefore readily collapses and arrests bleeding, is almost *nil*, yet in adults the fibroid elements, now in excess, and which relatively increase as age advances, form a tissue less favorable for the retraction and closure of the cut vessel than the spongy mass of a young tonsil largely composed of lymphoid tissue. (Wright.)

This explains why the cases of alarming hæmorrhage occur almost entirely in adults. Many operators of large experience have never lost a patient from hæmorrhage, and have only seldom seen it become severe. There are no large vessels supplying the tonsil, and experience proves that the bleeding after tonsillotomy ceases spontaneously, or is easily controlled by the application of nitrate of silver, by iced-water gargles, or by cold cloths applied to the neck. Should the bleeding be severe we may use Mackenzie's gallo-tannic acid paste, perchloride of iron, torsion, pressure directly applied, ligature of the stump, or the actual cautery. Should these fail the common carotid may be ligated —recovery took place in three recorded cases in which this was done. In two of the six fatal cases referred to above, the common carotid was not ligated. So that the alarming danger of hæmorrhage resolves itself, according to the records of the past twenty-five years, into two fatal cases, and there is no evidence to show that the previously-mentioned means to arrest bleeding were employed in these two cases. Still, bearing in mind the fact that all the fatal cases have not been reported, it is evident that the entire number, after all, is not so small.

To diminish to a minimum the danger from hæmorrhage, we have the comparatively bloodless operation by the cold snare, operations by ignipuncture, and by the galvano-cautery amygdalotome. Of these the galvano-cautery amygdalotome seems preferable, and is highly recommended by Wright, of Brooklyn. Ignipuncture is tedious, requires repeated applications, and is attended by considerable pain. Moreover, it cannot be employed in the cases of refractory children.

HOW A GENERAL PRACTITIONER MAY TREAT CHRONIC ATROPHIC RHINITIS.[1]

BY HANAU W. LOEB, A.M., M.D.,
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FROM the time when the Chinese Emperor, Hoang-ty, 4500 years ago, first described specific ozœna, until the present day, the treatment of chronic atrophic rhinitis has been, more or less, the bugbear of the general practitioner of medicine. The disease now lacks many of its mystifying elements, but even in this enlightened day it remains a stumbling-block in the practice of many physicians.

Notwithstanding the great amount of literature which has resulted from the painstaking study of this disease, the vast majority of doctors are indifferent, some perhaps ignorant, as to its proper treatment. Some do not believe that an iota of benefit can result from treatment of any kind; others declare that they have no desire to treat it; while still others, by temporizing, hold their patients day in and day out, in the vain hope that some kindly providence may relieve doctor or patient. Amid all this array of indifference, disinclination, and lack of knowledge or of its application, is it strange that the poor sufferer should read, with a shudder, the advertisements which describe his symptoms so exactly, and which alarm him by unnecessary warnings of dangers which never occur? Is it to be wondered at that his mind becomes filled with visions of consumption—visions which, by reason of their indistinctness, magnify the evils thus portrayed? Is it remarkable that he should swallow with avidity such unwholesome morsels as this? "The microbe of catarrh, in your sleep, crawls down your throat, and, coming in contact with your lungs, produces consumption." Is there occasion for further wonder that the poor, bewildered mortal, whose fears have now changed his nose into a mountain of woe, should seek his family

[1] Read before the Medical Society of the Missouri Valley, Kansas City, Mo., December 18, 1890.

physician, and receiving the unsatisfactory advice—which in many cases he will get—is it strange (say I) that he should place himself in the hands of a quack? I think not. From a popular standpoint, at any rate, the charlatan who loudly boasts of his cures, and who points out the evils that may result, knows far more than the dilly-dallying doctor. Here lies the trouble—doctors imagine the nose is beyond their ken—too far removed for their comprehension; in fact, many do not hesitate to say so, though these same doctors would never admit a lack of knowledge in the treatment of a cervicitis or an endometritis, and yet the organs concerned in these diseases are far more difficult to examine than the nose.

Thoughts such as these are calculated to make a specialist ponder, and to seek for some plan of benefit. That some good may come from a tacit and clear statement of the treatment of this disease, I am sure, and that the general practitioner will, by the application of a few general rules, be able to benefit almost all of these cases, I am certain. I have seen this very thing exemplified in my own students in the Marion-Sims College of Medicine, to whom I have assigned cases for treatment in the Clinic, with highly-satisfactory results. If students are thus capable of treating nasal catarrh, I feel certain that the great body of conscientious practitioners of medicine can do far better. Many means have been devised and many remedies have been suggested for the treatment of this very refractory disease, but as its theoretical consideration forms no part of the subject of this paper, they will not be considered. Therefore the radical treatment of the disease, requiring, as it does, an extensive knowledge and technique, will not receive attention. That the disease is ever entirely cured is still a controvertible question. Reports have been made of cures by cauterization with chromic acid and the galvano-cautery, and by galvanism of the nasal mucous membrane.

From the nature of the disease, and the abnormal secretions which it causes, one can easily understand that two features of treatment are indicated, viz: cleanliness and stimulation—cleanliness so that there can be no irritation from the presence of scabs, and for the thorough application of medicines; and stimulation to counteract the passive inflammation, and to cause the mucous membrane to approximate more nearly the normal by filling it with wholesome blood.

Cleanliness does not mean promiscuous douching or spraying of the nose. The greatest care must be taken to remove every scab and particle of abnormal discharge. This can be done by the general practitioner readily enough, and his armamentarium need not be very extensive. A lamp—a student's lamp being preferable—a head-mirror, a nose speculum, a small cotton applicator (a knitting-needle with one end roughened will answer) constituting an equipment not elegant, but sufficient. The cost, exclusive of the lamp, is little enough, being less than $4. Cotton, absorbent or borated, should be on hand, as well as plenty of Dobell's solution, or the following modification, which I like better:

℞.—Sodii bicarbonatis } . . āā ʒij.
Sodii biboratis }
Listerine or "katharmon" . . ℥ss.
Aquæ q. s. ad. . . . . ℥viij.—M.
Sig.—Nosewash.

To the list I should perhaps add some sort of atomizer or post-nasal syringe, costing in either case not more than $1.25. However, one could get along without either of these. The nose should first be sprayed out with the solution the formula of which I have just given (better warmed), or by means of the post-nasal syringe the cavities can be washed out from behind. Understand, however, even this does not constitute true cleansing of the nose, for after this has been done the work really begins. The light being reflected into the nose, held open by means of a speculum (Knight's modification of Duplay's preferred), the probe, to which a pledget of cotton is attached, is made to dislodge and remove each scab or portion of discharge which is presented to the view. Anyone can do this, for anyone can see the scabs and can with ease remove what he sees. This accomplished the nose is clean, and the first essential part of treatment has been applied.

For the stimulative plan of treatment various drugs have been recommended, out of which I select menthol, thymol, and eucalyptol as having been most efficacious in my hands. I have used menthol more frequently than any of these agents, and have been so well pleased with its action that I should be unwilling to exchange it for any other remedy. The following is the customary formula:

℞.—Menthol . . . . . gr x.
Liquid albolene . . . . . fʒj.—M.
Sig.—Spray for the nose.

The amount of menthol may be increased to twenty grains or even one drachm to the ounce. This, or thymol, ten grains to one ounce of liquid albolene, or eucalyptol, ten drops to one ounce of liquid albolene, should be well sprayed into the nose, first directing the patient to breathe through his mouth, thereby shutting off the oro-pharynx and causing the spray to pass out of the other nostril. The first sensation is that of warmth, and no little itching is frequently occasioned; but this is soon succeeded by a feeling of coolness and comfort in the nose which is gratifying to the patient. While

the menthol, thymol, and eucalyptol have a stimulative effect, the liquid albolene is not void of benefit. It takes the place of vaseline, but possesses nothing of the almost nasty characters of the latter. By means of the spray, the oily albolene is thrown over a large portion of the mucous membrane, and by covering it with an oily film, aids not a little in its improvement. This cleansing treatment of the nose should be resorted to every day, if possible, for some little time; later, the intervals may be lengthened. It is useless to attempt to produce any permanent or even transitory improvement, by treating the nose twice a week or less; three times a week is seldom sufficient at the outset.

Nor is this all there is in the treatment. The patient should be directed to clean his nose three or four times daily, by snuffing up Dobell's solution or the modification which I have given, and thereafter using a spray of menthol, thymol, or eucalyptol and albolene. A special form of atomizer must be used, because all atomizers do not act with oily solutions. Each patient must provide himself with one, and use it three or four times daily. The Codman & Shurtleff No. 356, or the Brooklyn Throat Hospital Atomizer, will answer. The latter is better for the doctor, in that having three nozzles it may be used for the nose, pharynx, or larynx.

Of late I have been using a new atomizer, lately designed and manufactured by the A. M. Leslie Surgical Instrument Company, of St. Louis—the Acme Vaseline Atomizer; in fact, I now prefer it to any other kind. It has the advantage of simplicity and cleanliness. Though intended as a vaseline atomizer, it can be used with the greatest satisfaction for the spraying of liquid albolene. I would again urge that the atomizer be used systematically, thoroughly, and regularly. It is surprising how much better the patient will become under this treatment; the excessive scabby discharge ceases, the odor disappears, the hawking diminishes, and the patient's mind turns to other thoughts than an untimely death from the fancied change of catarrh into consumptton.

It is well to state one danger which may occur not only from this form of treatment, but in any case where douching of water is used: I refer, of course, to otitis media, catarrhal or suppurative. Where there is the slightest tendency to this disease, one must be guarded and must avoid the douche, and sometimes the spray. In such cases, the only recourse is to remove the scabs as well as possible by means of a probe and pledget of cotton.

Very naturally there are other plans of treatment which are not to be despised. I desire to make no reflection whatever upon any other method. This I do say, however: the method which I have detailed is one which must commend itself to everyone. It is simple in its application, and sufficiently easy in detail as to be within the range of every practitioner of medicine.

3148 LOCUST STREET.

A CASE OF ACTINOMYCOSIS.[1]

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THIRTEEN years ago Bollinger showed that the disease in cattle know as "lumpy jaw" is due to a parasite, and a year later Israel found the same parasite in the discharge from an abscess connected with the pleural cavity in a woman. The parasites were named actinomyces, and the disease actinomycosis.

The disease is very common in the cow, less common in the pig and horse, and, according to recent observations, not very rare in man. It most commonly attacks the tongue ("woody tongue" of cows) and the lower jaw, but has been found in every organ, reaching the different parts of the body, either by continuous growth or by being carried through the blood- or lymph-channels from the original focus.

The parasite is a fungus, not yet permanently classified, composed of radiating filaments, somewhat club-shaped at the ends, but frequently split into a number of smaller parts. Under the microscope it can be recognized with a power of 250 diameters, but it requires an immersion lens of from four to six times this power to make apparent its finer subdivisions. One can, however, recognize collections of these fungi with the naked eye. They form small, pale-yellow granules, reminding one of mustard-seeds which have been immersed in liquid.

When the location of the infection favors the formation of a tumor of considerable size, the tissues composing the growth are also characteristic to the naked eye. They resemble loose, flabby, granulation-tissue interspersed with the characteristic yellow granules. Each of these granules contains a number of microscopic spherules, and each of these is one of the fungi. The fungi can be readily demonstrated by immersing one of the granules in a ten-per-cent. solution of potassium hydrate in water, and placing it under the microscope. The pressure of the cover-glass crushes the spherules and makes them somewhat irregular. The parasite can be stained most conveniently by Gram's method, either on the glass slide or in sections, but for diagnostic purposes staining is not necessary.

The manner in which the parasite enters the body is often obscure. It may enter through an external wound, through a hollow tooth or an abra-

[1] Read before the Illinois Microscopical Society.

sion in the mouth, through an abraded surface in some part of the alimentary canal, or by inhalation through some part of the respiratory tract. In many cases infection might easily have been prevented if it were generally known that "lumpy jaw" in cattle can be transmitted both directly and indirectly to man, and that the disease in man is quite as fatal as in animals. Very frequently the manner of infection can be directly traced. A farmer or drover will, for instance, use the jack-knife that he carries in his pocket, for the purpose of opening a tumor in a case of "lumpy jaw," and later will use the same knife for cutting his own food. Again, such persons handle these animals and then eat without washing their hands, or they drink out of pails or from pumps which have come in contact with diseased animals, or use spears of infected hay or straw as tooth-picks.

It is almost certain that the parasite lives and thrives on the surface of several plants, and that it is frequently introduced together with parts of these plants or by coming in contact with some abraded surface, and that in animals infection very frequently takes place from wounds of the gums, which become filled with these parasites while the animal eats grass, hay, straw, or grain on which the parasite has developed. So much for our present knowledge of this disease.

The case that I have under observation at present is a gentleman fifty-three years old, a farmer by occupation, healthy until eight months ago, when he began to suffer from severe continuous pain in the region of the left antrum of Highmore. He had four decayed teeth removed from the left upper jaw but was not relieved. Soon after this an abscess formed and pointed on the cheek at a position opposite to and a little above and behind the canine fossa. This was opened by his physician, and subsequently twice opened spontaneously before he was referred to me at the Augustana Hospital, August, 1890. When I first saw him, the skin surrounding the sinus was thickened and infiltrated, and a drop of pus squeezed from the sinus contained the characteristic pale-yellow granules which were proved to contain actinomyces.

The treatment consisted in removing all of the soft tissues which were involved, in chiselling away the outer surface of the antrum, thoroughly curetting the cavity, swabbing it out with ninety-five-per-cent. solution of carbolic acid and then packing it with iodoform-gauze. The wound healed normally from the bottom by granulations, and the patient did well until October, when an œdematous mass appeared above his left ear. I opened this and again evacuated half an ounce of pus and granulation-tissue containing the same characteristic granules in which were the parasites. This cavity was also packed with iodoform-gauze and is healing by granulation. The patient is now doing well, and unless the parasite has advanced to some other point, which cannot as yet be determined, he will undoubtedly permanently recover. Infection in this case probably took place through the patient's decayed teeth. From October, 1889, to February, 1890, he had handled and treated a horse supposed to be suffering from "lumpy jaw," and not knowing the dangers of infection had been rather careless.

Four years ago I reported a case of actinomycosis of the lungs.[1] The patient was treated with arsenic and sent to New Mexico, where, I am told, "lumpy jaw" does not occur among cattle. He lived four years, and died last June from actinomycosis of the lungs, judging from the statement of friends. No autopsy was made.

When I first treated this patient I made a number of experiments on animals, inoculating rabbits under the skin of the ear and in different parts of the body, but with negative results. The material used for inoculation consisted of the granules found in the sputum of the patient. The last experiment that I made consisted of inoculating a rat between the teeth. About two weeks later the animal disappeared, but in two months the mate of this rat died from actinomycosis of the shoulder and neck. Not having inoculated the mate, and having lost the original rat, I never reported the experiments, but, of course, it is probable that the mate was infected with actinomycosis by the inoculated rat. The rat was kept in a large room where it could easily get under some boards; it probably became ill, and hiding somewhere, died from the disease.

CONSERVATIVE SURGERY IN INJURIES OF THE FOOT.[2]

BY J. T. WILSON, M.D.,
OF SHERMAN, TEXAS.

EVEN with the modern methods of surgery there are many feet sacrificed to a want of patience and proper management of the injuries that may have been received. It is, doubtless, true that injuries of the foot, as we have been taught, are more serious than those of the hand, because the foot is larger, and at a greater distance from the centre of circulation, and hence has less power to repair mischief, and is much more susceptible to suppuration and gangrene, yet it is very amenable to treatment. It should ever be the surgeon's earnest desire and aim to save the foot, and, if possible, in a useful shape. With the knowledge of the subject, and the resources we possess at the present day, the successful treatment of injuries of this part is more certain and satisfactory than formerly. I have seen several cases of foot injuries in which the member was sacrificed to a want of patience and good judgment—cases that in all probability would, with careful attention, have

[1] Medical Journal and Examiner, December, 1886.

[2] Read by title before the Southern Surgical and Gynecological Association, November 12, 1890.

been restored to their former usefulness. Some surgeons prefer amputation and treatment of the stump to what may seem to promise prolonged attendance upon a slowly-healing wound; but the loss of even a portion of the foot, or of several of the toes, is so serious that we should not permit our personal preferences to influence our judgment against conservative treatment when there is a possibility of the part being saved.

CASE I.—Some years ago a man came under my observation about twenty-four hours after having had his foot caught between two heavy logs. There was some excoriation, but the true skin was not broken, all of the metatarsal bones, except the fifth, and one of the phalanges of the second toe, were fractured, the internal cuneiform being displaced. The foot was greatly swollen, bruised, discolored, and painful, and the attending surgeon was of the opinion that amputation by Chopart's operation was the best treatment. But after further careful examination and consultation, the circulation appearing not to be seriously interfered with, it was decided to wait for a day or two. Under the influence of chloroform the displaced bone was pushed into position without much difficulty. The foot was immersed in hot water, carefully bathed, gently rubbed with a soft cloth and the hand, and then was enveloped in a layer of cotton-batting held in place by a well adjusted bandage and splint. The pain was much relieved, and the patient passed a comfortable night. The dressing was changed once daily after the second day, the foot being bathed and rubbed with sorbefacients, and the bandage tightened a little after each dressing. It was practicable by much care to keep the fractured ends of the bones in apposition, and thereby good union was secured. The general health of the patient was excellent. He recovered without deformity, and the foot was restored to its former usefulness.

CASE II.—Another case was that of a boy, whose foot had been caught under one of the wheels of a heavy truck, the uneven surface and the soft ground doubtless protecting the member from a much greater injury than it actually received. He was taken into the office of a physician near by, who called a consultant, and after an examination under chloroform it was decided that amputation was the only remedy and I was requested to do the operation. I found upon examination a lacerated wound, about four inches long, upon the outer dorsal surface, and involving the heel; there was crepitation over the dorsal surface, but it was the crepitus of air which had penetrated the cellular tissue. I could not detect any fracture. It was then determined to envelop the injured part in an antiseptic dressing. It is needless to say that this boy's foot was completely restored to usefulness.

CASE III.—In a gunshot wound the ball, from a 0.45 calibre Colt's revolver, penetrated the instep and lodged in the scaphoid bone. Fifteen hours after the accident the case was examined, but the ball could not be found. The foot was then put at rest and cold-water dressings adopted. In five or six days the man became restless, and bundling up his foot began his occupation, that of a laborer, and though it gave him considerable pain, he would not remain quiet, or give the wound much attention. Soon after this, inflammation began in the bone, followed by suppuration and pain for many months. The bones became enlarged and tender and the tissues infiltrated, and the patient's general health failed. He was anxious to have an amputation performed above the ankle. However, I removed the diseased tissue and bone, irrigated the wound thoroughly with a solution of carbolic acid, made counter-openings in the sole of the foot and inserted drainage-tubes. The parts were kept perfectly clean, and at rest in as comfortable position as possible. Tonics and good food were administered, and the patient began to improve at once, and recovered with a useful foot.

CASE IV.—A man, while chopping wood, wounded his right foot just above the metatarso-phalangeal articulation, and profuse hæmorrhage followed, but was controlled. An aneurism of the lower portion of the dorsalis pedis artery formed, and in the following five months he had two serious hæmorrhages, which were very difficult to control. Inflammation and suppuration set in, involving the first and second matatarsal bones. It was thought by the physicians who saw him that amputation of the foot would be necessary, and he was in constant dread of hæmorrhage. I was requested to see him, and after consultation we decided to ligate the dorsalis pedis artery and remove the dead bone. After the ligation the carious portion of the first metatarsal was scraped away and the phalangeal extremity of the second metatarsal resected. Recovery was rapid. This man having valvular disease of the heart, and being somewhat prostrated from previous loss of blood, he narrowly escaped death from chloroform-narcosis.

A majority of surgeons have methods of their own for surgical operations and dressings. A new method is exceedingly rare, but many surgeons think that their own mode of doing an operation or of applying a dressing has advantages over others, and it is well that this is so, because it gives the surgeon more self-confidence and self-reliance, and enables him to do greater service to his patients. Then, too, a different application of the same principle may effect different and better results. With antiseptic methods suppuration of the foot of a healthy person can almost invariably be prevented, even though the tissues be much bruised and lacerated. By a careful attention to the injured part and the general system, by absolute rest and a judicious dressing, the bruised tissues will soon regain their normal condition if the bloodvessels be not destroyed and the circulation not entirely cut off.

An njury of the foot of whatever nature irritates the nerves, tendons, and muscles, and induces contraction, which is painful, interferes in some measure

with the circulation of the blood and retards the healing of the wound; it is, therefore, necessary in such conditions that complete rest be given, and this can be accomplished by bandages, splints, slings, and props. Position is important, because by this means comfort may be secured and the displaced parts adapted to their natural position, which is the more favorable one for repair. The circulation can be regulated by gentle, efficient massage and by changing the position from time to time. It is important to restore the circulation as soon as possible after the injury has been received, and this can be accomplished by keeping up the temperature of the part. Usually the foot placed on a level with the body, or a little higher, is the most favorable position, but it can be changed to a higher or lower one, sometimes with great benefit; when the circulation is feeble a dependent position at short intervals and for varying periods will act advantageously.

The same dressing will not answer in every case. In some injuries splints are necessary, or plaster or starch bandages; in others a simple roller or a sling is better. The dressings of cold water will do more good in some and warm or hot water in others. In some cases a liniment will serve the best purpose, in others an ointment. In many open wounds, especially if the surface is suppurating, an antiseptic unirritating powder, such as boric acid, iodoform, iodol, bismuth, oxide of zinc, powdered hydrastis, etc., will be of the greatest service. I have had no experience with the new antiseptic *aristol.*

The general system should be carefully attended to; it may be in a bad condition when the wound is received, or from confinement it may become so soon after, and this will be an impediment in the progress of repair. Attention to the secretions, to digestion and assimilation, to the functions of the liver—especially in a southern climate—skin and other organs plays an important part in the management of these cases.

In contused and lacerated wounds the best results are obtained by keeping the foot at absolute rest in a comfortable position during the first part of the treatment, by cleanliness and by soothing applications. Punctured wounds of the plantar surface are generally regarded as more dangerous than similar wounds elsewhere; complications are more common, tetanus is more frequent, and there is more trouble in causing the wound to heal. Removal of foreign substances, antisepsis, and free drainage will accomplish satisfactory results in nearly all cases.

In gunshot wounds the parts are generally much lacerated and bruised. We should persevere in our efforts to clean the wound of every particle of foreign substance, clip off all ragged edges, and convert it as nearly as practicable into an incised wound. The ligatures and sutures should be thoroughly antiseptic. The fractured ends of bones and the soft parts should be nicely coaptated and carefully maintained in position for the first few days in as near absolute rest as possible. Contusions of the bones are frequently far more serious than those of the soft parts; inflammation is more liable to be set up and to be followed by suppuration, caries, and necrosis. In bad sprains of the foot immersion in water as hot as can be borne soon after the occurrence of the injury, boiling water being added until the temperature is raised to the highest degree of tolerance, will do more than anything else to relieve the acute suffering and lessen the swelling. This should be followed by a gentle shampooing, while the foot is elevated above the level of the body until the surface is quite dry. A plaster bandage should be applied in such a way that the circulation will not be interfered with, and the foot placed in a comfortable position and retained for a few days at complete rest. Then the bandage should be removed, the shampooing again instituted, passive motion carefully and gently begun and repeated at intervals. This treatment requires good judgment and patience, but is very satisfactory, and, I believe, in those rare cases in which the safety of the foot is endangered, will often prevent serious consequences. I am of the opinion that a wounded foot should receive antiseptic treatment, whether the skin is broken or not.

I have thought that my results were much better in cases in which I thoroughly washed the whole foot in hot antiseptic solutions. The somewhat uncertain state of the surgical mind in regard to the antiseptic treatment of wounds and in the choice of an antiseptic, should not cause us to neglect these precautions. That antiseptic surgery has marked perhaps the greatest advance known to our art, the bold operations of to-day, the explorations into every cavity of the body conspicuously testify; that under its use there is a more rapid and ready union of wounds, less suppuration, and fewer cases of septic poisoning than under the old *regime*, is patent to all. In cases in which it is impossible to prevent suppuration, drainage-tubes may be used with benefit so long as they seem to be actually required, and removed as soon as they cause irritation. Some cases too, with profuse suppuration, require counter-openings in a different part of the foot to insure perfect drainage.

If a plaster bandage is too heavy, a starch or silicate of sodium bandage makes an excellent substitute. In a highly-inflamed and swollen foot ice properly applied is capable of doing much good, but should not be allowed to remain long. While poultices in the same conditions can be applied with advantage, they will, on the other hand, do harm if

not removed before they cause maceration and irritation of the skin.

Hæmorrhage should be controlled as soon as possible and clots removed, the parts cleansed of all foreign bodies, such as earth, sand, clothing, detached pieces of bone, and badly-bruised and lacerated tissues. Extreme tension is best relieved by incisions, the wounds irrigated with an antiseptic solution. Catgut is, I think, the best suture for the foot, but if not at hand, sterilized silk or flax thread may be used. I deem it an important point to have all thread used for ligatures and sutures previously well boiled and immersed in a strong solution of carbolic acid.

In bringing the edges of wounds together the sutures are frequently drawn too tight and when swelling occurs they are liable to cut their way through the inflamed tissues, and interfere with union. I have obtained the best results by changing the dressings as infrequently as is compatible with an aseptic condition of the wound.

Massage is important in the treatment of extensive wounds of the foot; it stimulates the bloodvessels, muscles, and functions of the limb. If the skin is not broken, and tension not extreme, massage will assist in the absorption of fluids.

In cases in which an operation is necessary, if there be shock, by the free use of antiseptic dressings and controlling hæmorrhage if present, the operation may be deferred until shock has been recovered from.

Immediate union should be secured, if possible, in all wounds of the foot. When, for any reason, the wound cannot be closed, it may be successfully treated by the open method, and antiseptics have rendered this mode very satisfactory in many cases. If bloodvessels and nerves are not sufficiently destroyed to cause the early death of the part, amputation should not be hurriedly performed, even though it seems improbable that the foot can be saved. While there is living tissue it should be given the chance for repair.

Resection of the bones of the foot can frequently be performed with gratifying success. Dr. Schuchardt,[1] of the German Army, in discussing excision of joints in gunshot wounds, states that "the formation of new bone is less copious under the antiseptic *regime* than formerly, which is a decided advantage, but one which is amply compensated for by the fact that the antiseptic *regime* admits of more conservative treatment."

Tendons and nerves can often be sutured, and frequently unite; and ulcers can be made to heal by scraping away all necrosed and unhealthy tissue, and by rest and antiseptic dressings. Even gangrene following extensive burns and frost-bites will often terminate surprisingly well and without the loss of the entire foot if carefully managed. The most serious consequences sometimes result from apparently insignificant wounds, and with this fact in view it behooves us never to overlook an injury brought to our notice, no matter how trivial it may appear.

The secret of success in the treatment of foot-wounds lies in vigilance, patience, and persistence, and in giving the strictest attention to all details; the disregard of which is the cause of many failures.

The temptation to make a brilliant operation through some joints of the foot may seem too great to resist; but we should not permit such a temptation to warp our judgment nor lead us to sacrifice the part. Such an operation may present an appearance of beauty and seem scientific in the highest degree to the unprofessional observer, and will probably add to the surgeon's reputation among the laity, but the consciousness of having sacrificed a part of the foot to the desire for *éclat* would, as Professor Gross used to say, "bring the blush of shame to our cheeks," whenever we should meet our unfortunate victim face to face.

[1] Annual of the Universal Medical Sciences, 1889.

THE GENERAL AND LOCAL TREATMENT OF GANGRENOUS WOUNDS AND DISEASES.[1]

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THE surgical procedures in gangrenous affections, the proper stage for operation, and the propriety and necessity of operations in certain conditions, are questions already so well settled that nothing can at present be added to our knowledge of the subjects. Therefore, it is not proposed in this paper to allude to these questions, but to discuss the various methods of treatment, both of a local and general character, found by the writer to be the most efficient for the prevention and arrest of gangrene. We know that traumatic gangrene is more amenable to treatment than is the idopathic form, from the fact that the former is of a more transient nature, while the latter is usually more dependent on certain fixed organic changes, such as the arterial degeneration of old age, thrombosis of large arteries, embolism, or certain blood-changes.

Previously to the late war I determined to institute a series of experiments in every case of gangrenous wound or disease coming under my observation, on the capacity, or rather capability of therapeutic agents, and of various local and general methods of treatment to prevent or arrest the process of these affections. As gangrene is not actually a disease, but rather the sequence of disease, the

[1] Read before the Southern Surgical and Gynecological Association, November 11, 189.

direction of the treatment must of necessity be addressed to such diseases or conditions as may give rise to it, as well as to the peculiar sequence itself. It is proper here to consider briefly the various forms of gangrene in their relation to treatment. Probably the largest number of cases of gangrene are of the traumatic variety, and arise from lacerated, contused, crushed, or poisoned wounds, in which the vasomotor nerves of the part are paralyzed by the local shock, or structural damage occurs, from which blood-stasis results, and the nutrition of the parts is suspended. Here something else is needed besides antiseptics and disinfectants. Potent stimuli to the paralyzed vasomotor nerves and to vital action are also necessary. If vasomotor action can be aroused in these cases, nutrition of the injured part sustained, and disinfection accomplished, then the progress of the gangrene may be arrested.

The most important varieties of the idiopathic affection are the dry and moist forms arising from embolism or from thrombosis of a main artery. In the treatment of this class of cases the question confronts us in the beginning: Are there any means or methods that are actually capable of arresting its progress, and saving life, or avoiding the necessity of amputation? When the main artery of a part is obstructed from thrombosis, either transiently or permanently, and the distal extremity is dying from innutrition, can any method be devised by which a collateral circulation can be established to supply the place of the original circulation, reëstablish the nutrition of the parts, and arrest the process of gangrene? I feel sure that this has been accomplished, and in the course of my paper I will cite an example in which dry gangrene of the lower extremity, arising from occlusion of the popliteal artery, with absence of all pulsation in the posterior and anterior tibial arteries, and in the peroneal artery, above the gangrene, nevertheless had a collateral circulation sufficient to arrest the gangrene and save the limb so that the extensive excavation left from sloughing healed.

Hospital gangrene is probably due to a combination of influences, namely, an infectious poison acting on a wound in a constitution impaired by the various depressing influences of army-life and the hardships of war. During the recent war, in the field-hospitals under my charge, I found that separation of the wounded at great distances; their removal from house-tents, and the substitution of tent-flies under trees in high, unused localities, where fresh breezes could have fair sweep; the frequent and systematic changing of their location; the burning of all débris on the old localities; the methodical enforcement of cleanliness; and the administration of nourishing food, with the application of hot boiled water, and a saturated solution of the sulphate of zinc and dilute sulphuric acid to the gangrenous wounds, gave better results than any other method. Most of the valuable antiseptic agents now in common use were then unknown, or were not used as antiseptics. This is true of that most wonderful antiseptic, *bromine*, and while I have had no personal experience with this remedy in hospital gangrene, I have sufficiently observed its powers in other forms of gangrenous affections to convince me that it is one of the most potent agents for the treatment of this class of diseases. When diluted it possesses antiseptic and disinfectant properties, without caustic or destructive action. Here I wish to note the great differences in the method of treating gangrenous affections in ancient and in modern times. In retracing the history of the treatment of gangrenous affections the further we go back the more common do we find the use of destructive caustics, until we reach the traditional application of the actual cautery in its various forms. A single fact strikes our attention in this history, and impresses itself indelibly on our minds, and that fact is the utter failure of these violent measures to save human limb or life. The silent, painless, potent operation of the modern antiseptic and disinfectant, as they destroy germ-life and convert the most deadly animal poisons into innocuous and harmless matter, is in marked contrast with the horrors of the old caustic system. In our treatment of gangrenous diseases let us abandon the crude, barbarous systems of the past, and discard all caustic agents which have no power to correct sepsis, or infection, but which only destroy the living tissues.

In the study and practical treatment of these affections, we find that antiseptic and disinfectant action is not all that is necessary. We may destroy the primary germ and the poisonous ptomaïne, and still not be able to restore healthy vital action in the parts, or prevent the progress of necrosis. It was this hope of restoring vital action which led the ancients to use caustics and cauteries as local stimulants. I believe that we possess active stimulants of vital action which are devoid of all caustic or destructive power, and that there are certain agents which have a specific power of this nature. The agents of this character which I have relied on most frequently, and for the greatest length of time, are a concentrated solution of the sulphate of zinc and dilute sulphuric acid after the following formula:

℞.—Sulphate of zinc . . .	1 ounce.
Dilute sulphuric acid . .	4 drachms.
Water	1 pint.—M.

This mixture is one of the most potent stimulants of vital action in gangrenous tissues, or rather in the

contiguous tissues, and is one of the most effectual means of arousing vasomotor action in the capillary vessels when vitality is impaired but not lost, of which I have any knowledge. At the same time it causes the gangrenous tissue to shrink and separate from the sound parts, often with unexpected ease and rapidity. I have experimented with this combination in a large number of cases of sloughing wounds and tissues, some limited, others extensive, in the past thirty-two years, with favorable results in the great majority of cases. During the late war I found it invaluable. In gangrenous or sloughing wounds, in which the process of mortification is rapidly progressing, with utter loss of sensibility and entire vasomotor paresis, and with the tissues breaking down extensively, without any tendency to establish a line of separation, it has often given me excellent results. It is exceedingly cleanly, and when acting favorably changes the offensive, fœtid, filthy parts rapidly and effectually. The action in many cases in hastening and facilitating the separation of the sloughs has been most satisfactory, leaving in the place of the sloughs a healthy basis for granulation. Under this influence I have known large areas of sloughing matter to be thrown off in forty-eight hours, and a healthy base to be established. I have usually applied the solution every three hours by means of cotton-wool. If the sloughs are dense and impenetrable the solution is also injected into them. When healthy tissue is found after the separation of the sloughs, the further application of this solution is no longer admissible, as its contact with the parts gives rise to intense pain. I know of no local stimulant that acts more promptly than this in developing renewed sensibility and vital action in tissues which are on the verge of gangrene and breaking down from necrosis. In small sloughing wounds I have found its action exceedingly prompt in removing the sloughs and leaving a healthy surface for granulation.

Another disinfectant, antiseptic, and potent stimulant of vital action in gangrenous diseases is bromine in solution. I usually employ as a local application two drachms of bromine in one pint of water. In this strength it may be freely applied to sloughing parts, and when the slough is impenetrable, injected into the gangrenous tissue. In certain cases in which gangrene was arrested by the use of bromine and in which cicatrization was completed after the suspension of the remedy, inflammation with a tendency to sloughing again commenced. A return to the bromine treatment invariably corrected the infection, arrested the inflammation, and changed the vital action in the parts with the result that healing again took place.

I cannot but regard a remedy combining these varied qualities as of infinite value. I repeat the assertion that of all local agents which aid in stimulating vital action in gangrenous structures, and in hastening the separation of the dead from the living tissues, the solution of bromine, dilute sulphuric acid, and concentrated solution of sulphate of zinc, in my experience, surpass all others. I desire to dwell especially upon the antiseptic and disinfectant properties of bromine, not simply as regards its local action, but also its power, when liberally applied, to prevent that form of septicæmia which arises from sloughing affections or wounds. If future experience should confirm this view, we have made, in the past few years, a great advance in the treatment of gangrene and its consequences. During the recent war I saw cases of septicæmia or pyæmia arising from wounds not more than two inches in diameter. I then treated all cases of this character under my charge by the local application of the concentrated solution of sulphate of zinc and dilute sulphuric acid, and with a fair degree of success. But the alternate application of these preparations and the solution of bromine as local means, leaves nothing to be desired.

I here wish to allude to my experience with the local use of hot water, both as a preventive and curative agent in the treatment of gangrene. In wounds with a feeble circulation, low vitality, and disinclination to heal, or with a tendency to gangrene, and in those which are actually gangrenous, there are few agents that act more efficiently as vasomotor stimulants to the injured parts than hot boiled water frequently and copiously applied. There is some art in the use of so simple a thing as hot water. More than forty years ago, in the practice of my old preceptor, the late distinguished Dr. Benjamin W. Dudley, of Lexington, Ky., I witnessed the method of treating all classes of wounds almost exclusively by hot water, and with the most excellent results. His method was the application of hot water that had been boiled and reduced to a temperature of from 110° to 120°. If the healing process was sluggish, or if there was a tendency to slough, the water was applied for from twenty to thirty minutes every one or two hours. The circulation and vital action in the parts rarely failed to improve under this treatment. An interesting illustration in his practice of the effects of applications of water at a temperature of 105° as a preventive of sloughing, was in his treatment of violent purulent ophthalmia. The water, in such cases, was poured on the eye and between the lids from the small spout of a one-pint tin vessel, for from ten to fifteen minutes every one or two hours; and among a number of cases which I saw treated in this manner there was not a single case of sloughing of the cornea. For more than fifty years Dr. Dudley treated all wounds, except those healing by first

intention, with hot water applications, and for more than forty years I have carried out these principles in my surgical practice with good results. Dr. Dudley attached great importance to boiling the water and reducing it to the proper temperature. He had a clear and well-defined idea that to be fitted for this purpose, all animal and vegetable matter should be destroyed by boiling. This is simply what is now termed "sterilized water" and which is universally sanctioned by the profession. He had a conviction that hot-water applications always promoted the healthy condition and healing of wounds, and at the same time prevented ill consequences, such as gangrene. Hence, in his practice, he never used cold water as an application.

I cannot permit this opportunity to pass without paying an humble tribute to the genius and ability of this, one of the greatest surgeons America ever produced. During the war I found hot-water dressings as a means of promoting reaction, as a preventive of gangrenous tendencies, and for improving the condition of unhealthy wounds, invaluable. I could procure hot water when nothing else could be obtained. A camp-fire, a camp-kettle, a tin-cup, and water, gave me a perfect sterilized dressing that was ample to keep wounds clean and healthy.

General treatment.—Can general treatment in any manner aid in arresting the process of gangrene and repairing its ravages? I feel sure that its capabilities in this direction are very considerable. To supply healthy blood in place of that which has been impaired, and to sustain vasomotor action and cardiac force, and, consequently, the general circulation, are the chief objects of general treatment. We have no internal antidote to pyæmia or septicæmia. All antiseptics for this purpose must be of a local character. Iron, quinine, and strychnine are our most important drugs for general treatment. I give the iron in the form of the tincture of the chloride in these cases, in doses of from thirty to forty drops every three hours. It acts as a permanent stimulant to the vasomotor system, improves the nutrient qualities of the blood, and aids in preventing the tendency to collapse. In cases of gangrene or sloughing wounds, in which the exuded blood consisted mostly of reddish serum, I have seen the blood under the use of iron become so rich in red corpuscles, albumin, and fibrin, that a few drops from a granulation would form a firm coagulum. This, to me, is a certain indication that sloughing is about to cease.

In those cases in which the circulation is feeble, the arterial tension low, and the vasomotor action nearly paralyzed, with a tendency to reduction of temperature in the wounded parts, I know of no general agent which gives impetus and force to the circulatory and heat-producing powers so promptly as nitroglycerin in doses of from $\frac{1}{50}$ to $\frac{1}{100}$th of a grain every three hours. In cases of thrombosis of a main artery, when we desire to establish a collateral circulation promptly, I believe that nitroglycerin, strychnine, iron, and strophanthus, are the most effectual means that we possess. In cases arising from embolism with septicæmia, I have found carbonate of ammonium to be valuable in connection with the remedies mentioned. In gangrenous affections, and particularly in extensive gangrene, the tendency to vasomotor paresis and general collapse is very great, and the remedies mentioned have often enabled me to tide over the emergency.

Alcoholic stimulants are indispensable in these cases, but to be of service they must be administered in large quantities. In cases of threatened or actual collapse from gangrene, I have found the system exceedingly insensible to the action of alcohol, and, consequently, capable of receiving large quantities before actual beneficial results are manifested. On one occasion, in a case of gangrene following a gunshot wound, the patient took one quart of whiskey daily, in the forms of milk-punch, egg-nogg, and pure whiskey or punch, before reaction was established. In such cases a good digestion and an abundance of concentrated nutriment are necessary to tide the case over the emergency. During the late war I saw a bad case of gangrene recover on little more than an abundance of whiskey and nourishment and hot-water applications. The patient had a good appetite and took with avidity all that he could get. Inability of the stomach to retain and digest sufficient nutriment to repair the blood depreciation, and maintain vasomotor action, is a great difficulty in the treatment of the septicæmia of gangrene. In this condition life largely depends on a vigorous stomach, plenty of nourishment, and the preservation of the system in an aseptic condition.

To illustrate more clearly the views presented in this paper, I will give in detail the history of certain cases of gangrenous wounds and diseases which have come under my observation at different times.

CASE I. *Gangrene of the external genitals in a woman.*—Thirty-two years ago, previously to our advanced knowledge of the antiseptic treatment of disease, I was called to a puerperal case which some days before had been delivered by a midwife. The patient was in indigent circumstances. On entering the sick-room there was an odor pervading the entire apartment so overwhelmingly offensive and fœtid as to create intense nausea and disgust. On examination, after the parts were deodorized with chlorinated soda, I found the entire external genitals enormously swollen, black, and insensible, and from them flowed an intensely offensive ichorous

discharge. The patient was suffering from septic fever, and was greatly prostrated. Although in this case there was extensive gangrene of the genitals, a sanious discharge, and genuine septic fever, there were no indications of true puerperal septicæmia. And yet the atmosphere surrounding this patient had been for days saturated with intensely offensive effluvia. But after the sloughing tissue was removed, a healthy base established, and free suppuration begun, all the symptoms of septicæmia promptly vanished, the breasts began to secrete, and the system returned to its normal condition.

In reference to the treatment of this case, it was found that the disinfectants then in use exerted no effect on the progress of the case more than to modify the sickening odors. The object was to adopt some agent that had the power not only to deodorize, but to disinfect and corrugate or shrink up the sloughing tissue, stimulate healthy action in the parts, and effect separation.

Previously to seeing this case I had had some limited experience with the use of a concentrated solution of sulphate of zinc and dilute sulphuric acid in the treatment of sloughing affections, and determined to use the present opportunity for experimentation with that remedy. A solution containing sulphate of zinc one ounce, water one pint, and dilute sulphuric acid one-half ounce, was freely applied, by means of cotton-wool and a syringe to the gangrenous parts. At intervals of three hours applications of water at a temperature of 120° were made. In thirty-six hours the results were surprising. The enormously-swollen gangrenous genitals, including the labia and nymphæ, from the pubes to the perineum, had sloughed off, leaving a perfectly clean surface, florid, and exquisitely tender to the touch, and all disagreeable odors had disappeared. So soon as this healthy tissue-base had been reached the solution caused intolerable pain, and had to be discontinued. This case recovered without further difficulty.

CASE II. *Gangrenous carbuncle.*—A German saloon-keeper, fifty-eight years old, a habitual beer-drinker, whose general health had been impaired by his habits, was attacked by a carbuncle on the back of the neck, extending from the scalp down to the sixth cervical vertebra. The carbuncle soon assumed enormous proportions, and the entire mass of tissue from the cutaneous surface to the spinous processes of the vertebræ became gangrenous. After a crucial incision much of this gangrenous tissue was removed. The cavity was then freely bathed with oil of turpentine. But it was not until applications of the solution of zinc and sulphuric acid were made that indications of a return of vital action in the parts appeared. Under continuous applications of the solution separation of the sloughing tissues progressed favorably, granulations began to appear, all offensive odors ceased, and abundant suppuration took the place of the offensive ichorous discharge. This patient's general condition was exceedingly unfavorable. His vital powers were greatly depressed, and the prostration was serious; his pulse was frequent, the extremities cold, his complexion sallow, and his appetite was entirely lost. There were evening exacerbations of fever and copious night-sweats. The patient took as freely as possible alcoholic stimulants in the form of egg-nogg and milk-punch; rich broth; the tincture of the chloride of iron in full doses; one one-hundredth grain of strychnine; the same quantity of nitroglycerin; and two grains of quinine every three hours. At night he took one-sixtieth of a grain of atropine for the night-sweats. In a reasonable length of time I had the satisfaction of witnessing a reaction in the general condition of this patient, the reëstablishment of healthy action in the wound, and the formation of a healthy base for the growth of granulations to fill the vast cavity left by the loss of tissue.

CASE III. *Hospital gangrene of the foot.*—The patient was a soldier who had received, in one of the battles near Richmond, a gunshot wound of the foot, producing a compound comminuted fracture of the metatarsal bones. The wound had been treated principally by means of cold-water applications. When brought into my field hospital near Drury's Bluff, the foot presented a dark, brownish-red color, with great œdema, accompanied with intense burning pain and symptoms of septicæmia. The wounded parts were thoroughly cleansed with soap and water, and dressed with hot-water applications. In twenty-four hours genuine hospital gangrene had developed, his pulse became frequent, his temperature rose, his tongue became dry, his appetite was lost, and his mental condition apathetic. (In almost every instance of hospital gangrene coming under my observation, mental apathy, together with an ichorous discharge from the wound, preceded the development of the disease.) The gangrenous process was extending to the ankle, and the general condition was rapidly becoming worse. The hot-water applications were repeated every two hours, and a solution, containing sulphate of zinc two and one-half ounces, dilute sulphuric acid one-half ounce in one pint of water, was applied. The entire foot was enveloped with raw cotton, which was saturated every three hours. Tincture of the chloride of iron in thirty-drop doses, strychnine one one-hundredth of a grain, and quinine two grains, were given every three hours, with the most nutritious diet that could be procured. In about two days the gangrenous parts presented a rather improved appearance. The process had not extended, the surrounding tissues had a better circulation, and there were less inflammation and swelling, and less pain. From that time to the cessation of the gangrene and the commencement of healing the improvement was progressive. The line of separation was established, the sloughs were thrown off, and a healthy basis was established. As soon as the sloughs separated and the healthy surface was exposed, the applications caused intolerable pain and had to be discontinued and a simple dressing substituted. But previously to this separation, while the sound tissue

was protected by the sloughs, the solution caused no pain whatever.

CASE IV. *Hospital gangrene following a wound of the thigh.*—Lieutenant B., a young Confederate officer in the Army of Northern Virginia, received a grape-shot wound, which extensively lacerated the tissues of the thigh, at the battle of Frazier Farm, 1862. The weather was intensely hot, the atmosphere malarial, and the army had been subjected to six days of hard fighting and marching. When the officer was admitted into my field hospital gangrene had set in at the points of entrance and exit of the ball. The skin around the wound was swollen, of a brownish-red color, and exuding a peculiar ichorous discharge. Very soon the surface of the wound became ashy gray and pultaceous. Already septic or pyæmic fever, initiated with a chill, had commenced. There were complete anorexia, mental apathy, and indifference. The patient was isolated under a tent-fly, and in the shade of a tree apart from the camp, and the fresh air permitted to sweep freely over him. The wounded parts were enveloped in raw cotton saturated with the zinc and sulphuric acid solution, and hot water was applied every two hours. He took iron, quinine, and strychnine, and as there was extreme depression, carbonate of ammonium was given at intervals. His diet was nutritious, with alcoholic stimulants in abundance. Under this system of treatment the gangrenous process was arrested in a reasonable time, and the sloughs, which were extensive, became shrivelled and corrugated, and fell off, leaving a healthy surface, while the general system rapidly responded to the improved condition of the wound. Then the zinc dressing, as usual, gave rise to acute pain and was discontinued. This patient recovered in due time and resumed his place in the army.

The last two cases are cited as examples of my method of treating hospital gangrene at that time. While the results of the method were favorable in the majority of cases, in a certain proportion of cases in which septicæmia was intense, with profound depression and exhaustion from army-life, all remedies, including amputation, failed. Yet in these cases, when I could improve vital action in the wound, disinfect the slough and cause the process of separation to begin, even in slight degree, the general system would promptly respond, as if the gangrene were simply a local process for the continuous generation of infective poison, and when the supply was suspended the effects immediately ceased.

CASE V. *Dry gangrene of the lower extremity.*—This, the case of M. R., a furniture-dealer, presents many interesting features. Some years ago the patient had facial paralysis, then for a time suffered from small carbuncles that sloughed to some extent. In February, 1890, the little toe of one foot became rather painfully inflamed, then the tarso-phalangeal joints became swollen, inflamed and painful, resembling rheumatic gout. After two weeks of great suffering a purple spot appeared on the dorsum of the foot, then vesication followed by dry gangrene which extended rapidly over the foot, excepting the plantar surface. The gangrenous process involved the skin, cellular tissue, muscles, and tendons down to the tarsal and metatarsal bones, and also the upper surface of the phalanges. During this protracted and painful process his general health suffered seriously. There were great mental despondency, but a keen desire to live, entire loss of appetite, sleeplessness, feeble and frequent pulse, jaundiced complexion, dry tongue, occasional rigors, evening fevers with night-sweats, and all the indications of septicæmia. At this stage of the case, at the request of the family, Surgeon-General Hamilton saw the case with me, and was so much impressed with its gravity that he regarded amputation above the knee as necessary to save life. This conclusion was reached because we could not discover a trace of pulsation in either the tibial or peroneal arteries. The inferences we drew were that thrombosis of the popliteal artery existed, and that a collateral circulation sufficient to nourish the limb could not be established. The question then arose whether the feeble circulation in the limb below the popliteal space, the pulsation of the femoral artery being perceptible above, was not already carried on by an imperfect collateral circulation. If the latter was the case the degree of circulation which returned to the limb after cessation of the gangrene, was remarkable. When recovery began the granulations were healthy and profuse, and the healing process continuous. The blood issuing from these granulations on the slightest touch was florid and coagulated rapidly, whereas before, only a dark, reddish serum escaped. Up to the present time no pulsation can be detected in the arteries of the leg.

If we were correct in the conclusion that there was occlusion of the popliteal, this case illustrates to a remarkable degree the powers of nature in establishing a collateral circulation of sufficient force to heal extensive wounds and support the entire limb. My patient was so resolutely opposed to losing his limb that I determined to resort to every resource of surgery to save it. My first procedure was to remove or dissect away with knife and scissors all loose sloughing tissue, including skin, muscles and tendons. Then the entire gangrenous surface was enveloped in absorbent cotton saturated with the zinc and sulphuric acid solution for the purpose of stimulating renewed vital action in the parts, and arousing vasomotor action and sensation. The first indication of a return of sensation in the parts was after these applications. The extensive diseased surface began to assume a more healthy appearance, but now the pain from the application on certain parts became intense, while in some directions the gangrene was extending toward the plantar region. A solution of bromine was then substituted. This solution was exceedingly soothing and at the same time it proved an active stimulant of vital action, and a potent disinfectant, and exerted a decided influence in controlling the infectious inflammation. At times the gangrene ceased, and the remedy was suspended. Localized gangrenous in-

flammation would then return, but the bromine again arrested this inflammation, and stimulated the growth of healthy granulation. I have invariably used the bromine in the strength of two drachms to twelve ounces of water.

The diseased foot was bathed in sterilized hot water every three hours, after which the bromine was applied. Over this an ointment composed of ichthyol three drachms, iodoform one drachm, carbolic acid ten drops, and cosmoline one ounce, was applied. The patient steadily improved under this method of treatment, but became dissatisfied with the offensive odor of the ointment, when the following was substituted: aristol one drachm, vaseline six drachms, lanolin two drachms. This acted well throughout the subsequent course of the case.

I desire to dwell at some length on the value of the agents used in this case not only in arresting the extension of gangrene, but in controlling that type of septic or infectious inflammation which usually precedes the death of the tissues. Hospital gangrene and the gangrene of erysipelas are well known to be infectious diseases, and infection is generated by the peculiar inflammation. The action of bromine in controlling hospital gangrene is manifestly due to its wonderfully energetic disinfectant powers.

In regard to the general treatment of this case of dry gangrene, every means was used for the purpose of improving and promoting blood-formation and nutrition with a view to counteracting the depressing effect of septicæmia. The patient took the most nutritious and concentrated food with an abundance of stimulants, and the traditional triple compound, iron, quinine and strychnine, in connection with one one-hundredth of a drop of nitroglycerin every three hours. Beginning with a feeble cardiac action, low arterial tension, cool extremities, lividity of complexion and feeble circulation in the diseased limb, the action of the heart gained force under the influence of these agents, the arterial tension greatly increased, the complexion improved, and the circulation about the diseased tissues became far more active. Healthy granulations began to form and the sloughs to separate and fall off, and under the disinfectant action of the local agents the septicæmia disappeared. Thus there was a collateral circulation established of sufficient force to enable the system to arrest the gangrene, throw off the dead tissues and begin the process of healing.

As a vasomotor stimulant and a means of invigorating the action of the heart and developing the capillary circulation, I am satisfied that nitroglycerin played a conspicuous part. The periosteum of the upper surface of the metatarsus of a portion of the tarsus, and of all the bones of the toes and their joints, were bared by the sloughing. Notwithstanding this, the profuse and rapidly-growing granulations finally covered most of these exposed bones. The chief difficulty occurred in the articulations, most of which became necrosed. The necrosis at different points was treated by applications of officinal dilute muriatic acid. I have found this, after experimenting with various agents, the most certain and effectual application to cause disintegration of the necrosed bone. Under its action the dissolution and disintegration of the phosphates and carbonates of lime of the necrosed bone progress with surprising rapidity. Necrosed bone contains but little animal matter, hence the acid has a fair opportunity to act. Occasionally since the recovery of the patient, small points of necrosis appear over the formerly-exposed bones through limited ulcerations in the cicatrix, and are successfully treated by means of the dilute muriatic acid.

CASE VI. *Gangrenous phagedæna of the penis.*—In this case gangrene was caused by a chancroid. When the patient came under my charge there was enormous œdema of the prepuce and glans, and the parts were black, pultaceous, and rapidly breaking down. The discharge was of an ichorous and extremely offensive character. Hot-water dressings were frequently applied, and the parts were enveloped in absorbent cotton saturated with the zinc and sulphuric-acid solution, heretofore mentioned, and renewed every three hours. The patient was given the tincture of the chloride of iron and dilute hydrochloric acid every three hours. In due time the offensive odors disappeared, the state of vital action in the parts improved, and the sloughs, under the influence of the zinc and acid applications, contracted and separated from the sound tissues. All of the prepuce, a portion of the glans and the skin on the dorsum, which was gangrenous, sloughed and left a perfectly healthy basis for granulation and the process of healing was accomplished in a reasonable period.

In this paper I have endeavored as far as practicable to describe cases representing the various forms and types of gangrenous affections, and the treatment found most efficient in each variety.

In conclusion, it may be stated, that to attain any degree of success in the local and general treatment of gangrenous wounds and diseases, it is absolutely necessary to discriminate between the various forms of the disease, also to determine the proximate cause and the general state of the patient. There are types of cases purely septic in origin in which sublimate dressings are applicable. There are other cases strictly of an infectious origin, upon which nothing acts better than bromine. Again, there are cases, whether of a traumatic or idiopathic form, in which vital action and vasomotor power are reduced to the lowest degree, and in these cases the strong solution of sulphate of zinc and dilute sulphuric acid acts well.

PRELIMINARY NOTES ON A CASE OF LUPUS VULGARIS TREATED BY INJECTIONS OF KOCH'S LYMPH.

BY JAMES HENDRIE LLOYD, M.D.,
AND
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OF PHILADELPHIA.

THIS case occurred in the practice of Dr. Lloyd four years ago. It was subsequently seen in consultation by Dr. Stelwagon, who, in view of the small size of the patch, operated by excision. A recurrence lately taking place, it was decided, after due consideration and upon the solicitation and acquiescence of the patient's parents, to treat the disease by the method brought forward by Koch. The injections were made at the boy's own home. The case is still under treatment and observation. The newness and great interest in this method justify the publication of these preliminary memoranda.

When the patient first came under our conjoint observation, two years ago, the patch of disease, situated on the left cheek near the angle of the jaw, was about the size of a small bean. It consisted of several closely contiguous characteristic lupus tubercles or deposits, with no tendency to ulceration, but with a slight disposition to exfoliation. It had then existed for at least six years, beginning when the boy was five years old. The result of the operation referred to above was apparently good, healing rapidly ensuing, and the disease exhibited no tendency to recur until nine months ago. At this time points of lupus-deposit began to show at the edges of the cicatrix, and have since progressed slowly. Two weeks ago, when Koch's treatment was begun, the whole patch was slightly elevated, and consisted of an oval-shaped scar, somewhat reddish, and with the peripheral portions studded with several small tubercles; each of these latter was covered with a minute scale.

The patient is a well-grown boy of fifteen years, a native American, well nourished and robust. No indication of tuberculous disease elsewhere in the body exists. The family history, however, is tuberculous.

Since the first injection the temperature and pulse have been recorded every two hours.

First injection, January 8th, 0.001 gramme of lymph. No systemic reaction. The patch showed but little, if any, reaction; it was possibly slightly more elevated and reddened.

Second injection, January 10th, 0.001 gramme of lymph. Slight chilly sensations four hours later, but no rise or fall of temperature. On the day following the patch was somewhat elevated, puffed, and reddened. The points of disease were not so prominent, this probably being only apparent and due to the increased elevation of the central scar-tissue. Two minute foci, not before seen, could now be detected at the edge. On January 12th the swelling and redness had somewhat diminished.

Third injection, January 13th, 1 P. M., 0.002 gramme of lymph. At 10 P. M. a severe chill, lasting a half-hour, accompanied with headache and aching of the bones, etc. The temperature rose rapidly until it reached 102.5° at 2 A. M. on the following day (January 14th). It then sank with some fluctuation to 101½°, rising again to 102⅕° in the afternoon. The area of disease became decidedly puffed, prominent, and red.

On the next day (January 15th) the temperature fell to 97°. The patient's general condition was good. The whole patch, including the scar-tissue, was paler. The scar was covered with scanty bran-like scales, the lupus-points were flatter and covered with a thin crusty-looking scale.

On January 16th the scaliness had become much more abundant, and directly over the lupus-deposits partook more of the nature of crusts than scales; the patch was pale pink and the puffiness completely gone. Over the trunk posteriorly a small papular, discrete and patchy, pink to red, measley-looking eruption was visible.

Fourth injection, January 16th, 12 noon, 0.002 gramme of lymph. Temperature three hours later was 97°. The rise began at 3 A. M. on the following day, reaching 101⅘° at 11 A. M., and toward evening falling to normal. The patch was now (January 17th) covered with much more copious bran-like scales, and was surrounded by an erythematous zone. The measly eruption on the back was brighter and more diffuse.

On the next day (January 18th) the temperature was more markedly subnormal than at any time during the treatment, falling to 96⅘°. At this time the pulse was 58. The patch of disease was apparently becoming less conspicuous and flatter.

Fifth injection, January 19th, 5.30 P. M., 0.002 gramme of lymph. Temperature began to rise at 4 A. M. on the next morning (January 20th) and reached at noon 103⅕°, at which time the pulse was 116, but of good force. No eruption on back. No chill. A feeling of nausea. The patch had a markedly-shrivelled and sunken appearance, with a pinkish flush surrounding it.

SUMMARY.—The patient has borne the injections well. There have been no alarming symptoms at any time. The dose has not been increased beyond 0.002 gramme, inasmuch as the reaction following each injection of this amount has been considered sufficiently intense. The sites of injection for the diameter of an inch or so become slightly reddened, the flush then gradually disappearing; at the site of the first injection the erythematous patch has remained, but in other respects nothing is to be noted.

The patch of lupus has been undoubtedly impressed, and, we think, in a decided and favorable manner; the diseased area being apparently less elevated and less conspicuous than before the injections were begun. The puffiness, prominence, and redness which followed the first three injections have been absent in the last two; in these last the result has been an increase in the exfoliation, and the appearance of an erythematous zone surrounding the patch. This zone disappears slowly during

the twenty-four hours following the injection. It is, of course, too early in the treatment to state the probable result. So far it has been sufficiently encouraging to warrant a continuance of the injections.

MEDICAL PROGRESS.

Pilocarpine in Diseases of the Ear.—Since 1880, POLITZER (*Lancet*, January 3, 1891) has employed subcutaneous injections of muriate of pilocarpine in every variety of recent and of chronic affections of the labyrinth, often with excellent results. He uses a two-per-cent. solution. At first two drops of this are injected under the skin of the arm, and the dose is increased by one drop each day until eight drops are given at an injection. Soon after the injection there is increased secretion of saliva and sweat for about forty-five minutes. If there are disagreeable effects, such as nausea, giddiness, faintness, etc., they may be overcome by the administration of a small dose of atropine. The injections should be made daily. If, after two weeks, the remedy does not produce an improvement of hearing, it must be regarded as ineffectual, and should not be continued; but if the hearing improves, the injections should be continued as long as the improvement progresses.

Dr. Politzer summarizes his opinions as follows: 1. The subcutaneous injection of pilocarpine is particularly indicated in recent affections of the labyrinth, be they syphilitic or not. 2. The injections are of little use in acute inflammation of the middle ear. 3. They are decidedly contra-indicated in cases of dry sclerotic catarrh of the middle ear. 4. Injections of several drops of a two-per-cent. solution into the tympanic cavity through a catheter are beneficial in some cases of catarrh with swelling and slight secretion. In such cases the injections should be given for from one to two weeks alternately with Politzer's method of inflation.

Ointment for Comedones.—The *Canadian Pharmaceutical Journal* quotes the following prescription, said to be used by Unna in the treatment of comedones:

℞.—Solution of hydrogen peroxide, Vaseline } of each 2 ounces.
Lanolin . . . . . 1 ounce.
Acetic acid . . . . . 1 drachm.
Mix and perfume.

Treatment of Laryngeal Spasm.—The treatment of spasm of the glottis is often difficult and uncertain in its results, but SIR MORELL MACKENZIE writes that by setting up a rival reflex the laryngeal spasm may be instantly overcome. The patient need only take a pinch of snuff or black pepper into the nostrils, or if neither can be obtained the nares should be tickled by a feather. The immediate result is a paroxysm of sneezing, after which the breathing is relieved.—*Hospital Gazette*, December 6, 1890.

The Administration of Oxygen by the Rectum and Hypodermically.—DR. FRANCESCO VALENZUELA, of Spain (*El Siglo Médico*), has published a paper on new methods of administering oxygen with especial reference to the treatment of senile pneumonia. Believing that oxygen inhaled in dyspnœa frequently fails to relieve because it does not come in contact with a sufficiently large vascular area, he began administering the gas *per rectum* and also hypodermically. In every case in which oxygen enemata were given dyspnœa was decidedly and permanently relieved. The ease and rapidity with which the gas was absorbed by the intestine were remarkable; indeed, it seemed to be as readily taken up by the intestine as by the lungs, four injections of five litres each being absorbed in an hour. Thus the intestinal mucous membrane may become a valuable adjunct to the lungs. In employing oxygen hypodermically Dr. Valenzuela believes that it is important to introduce the gas in its nascent taste. The arm was selected for the injections, and the quantity of gas introduced varied from half a litre to a litre. Cellular emphysema was, of course, produced, and a sensation of heat was complained of, but both disappeared within a few hours. There was no calmative action or slowing of the respirations, but there was marked stimulation of the heart, a desirable result in the collapse that follows pneumonia and fevers of a typhoid character, and cerebral congestion and asphyxia. No mention is made of the temperature of the gas that was administered, a point which, according to Dr. B. W. Richardson, is of great importance.—*Lancet*, January 3, 1891.

Treatment of Uterine Catarrh.—The *Revue Obstetricale et Gynécologie* (December, 1890) gives the following treatment for catarrh of the cervix uteri. After stating that it is best to have a syringe which will deliver the stream in jets, and that the injections should be repeated twice a day, the following medicated solution is valuable. These solutions may be either antiseptic or astringent. A useful antiseptic solution is to be made by taking 4½ ounces of boracic acid and dividing it into 10 powders, one of these powders is to be placed in 3 pints of boiling water; or, with equal advantage, we may employ 10 drachms of the sulphate of copper, which are to be divided into 10 powders, and one of these powders placed in 3 pints of boiling water; or, again, 2½ drachms of beta-naphthol may be added to 8 ounces of alcohol. Of this last solution, a teaspoonful is placed in a quart of boiling water; as soon as the water is cooled to a temperature of about 105° or 110°, it may be injected. In other cases, 4½ ounces of borate of soda may be divided into 10 packages, and the contents of one package be added to 3 pints of boiling water; or in its place may be employed 15 grains of nitrate of silver dissolved in 3 ounces of distilled water, of which a dessertspoonful is to be placed in 3 quarts of boiling water. In other instances from 20 to 100 drops of a solution of the perchloride of iron may be added to 3 pints of water and used instead of the solutions already named.

Prescription for Hemicrania.—In the *Journal de Médecine de Paris* the following prescription for hemicrania is given:

℞.—Antipyrine . . . . 3 grains.
Antifebrin, Powdered rhubarb } of each 1 grain.
Powdered calamus . . . ½ "
Powdered quinine . . . 1 "

This is to be made into 1 powder and repeated three or four times a day if necessary.

CURRENT LITERATURE.

SATURDAY, JANUARY 24, 1891.

DIAGNOSIS AND TREATMENT OF TUBAL PREGNANCY IN THE EARLY STAGE.

SMOLSKY calls attention to the fact that the teaching on ectopic gestation has undergone some changes during recent years. He claims that extra-uterine pregnancy occurs more frequently than was formerly supposed. According to M. Veit, nearly 28 per cent. of all cases of retro-uterine hæmatocele are due to tubal pregnancy with rupture of the sac. He recognizes the existence of ovarian and ovario-tubal gestations, but expresses doubt upon the possibility of peritoneal pregnancy. The tubal form is the gravest and the most frequent. Its gravity consists in a very considerable percentage of mortality, and in the possibility of sudden death. In the early months of tubal gestation the diagnosis is very difficult and often impossible, since most of the patients die during this period from a rupture of the embryonal sac with profuse hæmorrhage. He believes that more importance should be accorded to the form of the uterus than is usually done by writers upon the subject; of all the works he has examined Ernst Fränkel alone makes mention of this. As regards the size of the fœtal sac in tubal gestation, Smolsky has found that during the second month it attains the size of a pigeon's-egg; at two months it is as large as a walnut; at two and a half months as large as a hen's-egg; at three months it reaches the size of a fist, and at four months two fists. The signs of pregnancy, the metrorrhagia, the atypical pains, the insufficient development of the uterus with a parallel enlargement of a tumor on either side, the form of the womb, which is flattened in the antero-posterior diameter, the ineffectual contraction of the uterus without dilatation of the uterine canal, the consistency of the tumor, and the vascular bruit, are the diagnostic signs of this condition. The spontaneous discharge of the decidua he regards as of very important, but not decisive signification.

He draws the following conclusions from the information he has been able to gather from the literature on the subject:

1. The precise diagnosis of tubal gestation can be established by clinical examination. A sure way consists in careful and repeated explorations with comparison of their results.

2. In the present state of our knowledge, in most of the cases an absolute diagnosis is scarcely possible before the third month.

3. It is unnecessary and dangerous to use exploratory instruments, such as the sound and curette, in the uterine cavity to diagnose tubal pregnancy in its initial stages.

4. With a suspicion of tubal gestation and the appearance of a tumor on the side of the womb, in cases difficult of diagnosis, an exploratory laparotomy is admissible.

5. In case of the positive diagnosis of tubal gestation before the rupture of the sac, the best treatment is extraction of the sac by laparotomy.

6. In case of rupture laparotomy must be considered as obligatory, if the state of the patient gives rise to anxiety.

7. In case of completed tubal pregnancy it is necessary to take into consideration the life of the fœtus in fixing the time of operation.—*Archives d'Obstetrique et de Gynecologique*, December 25, 1890.

INTRA-UTERINE TAMPONMENT.

IN a communication read before the International Congress at Berlin, in August last, DR. AUVARD, of Paris, endorses Dührsen's method of tamponing the cavity of the uterus for the arrest of hæmorrhage arising from uterine atony. He claims that it is attended with but slight danger, and that its efficacy is generally recognized by the accoucheurs who have employed it. It should, however, not be employed until intra-uterine injections of hot water and subcutaneous injections of ergot have proved inefficient. The method of procedure is as follows:

The woman being placed across the bed (a vaginal douche having been previously given), with the aid of volsella forceps the anterior lip of the cervix is seized and brought down to the orifice of the vulva, whilst at the same time an assistant presses upon the fundus of the uterus to favor its descent. The cervix is then inspected to be certain that it is not the source of an arterial hæmorrhage, in which case a ligature should be placed around the bleeding vessel. The cervix being held at the vulva, the uterine cavity is abundantly flooded to favor the escape of the clots which it contains, and which should be, in difficult cases, removed with the fingers; this manœuvre is easy if care is taken to press simultaneously upon the fundus of the uterus. When the uterine cavity is free, the operator carries into it, by the aid of forceps or the fingers, the end of a strip of iodoform- or simple gauze (the latter should be previously soaked in boiling water for some minutes, or in a sublimate solution of 1 to 1000, and then carefully squeezed dry). The forceps, or fingers, are then withdrawn and a new portion of the gauze inserted, and this is repeated until the cavity of the uterus is filled. Before detaching the volsella forceps, the cervical canal should also be filled. Then, the cervix being freed, as much gauze as possible is introduced into the vagina; in a word, not only an intra-uterine tamponment is made, but also an utero-vaginal tamponment, which is surer. This tampon should be left in place twelve hours, a sufficient time for the hæmorrhage to cease.

Should the hæmorrhage be very grave, the procedure is somewhat different. The hand should at once be introduced into the uterus, the woman having been placed in the obstetrical position. Then, abandoning the fundus of the uterus to the care of an assistant, after having emptied the cavity of the uterus of its contents, the free end of the strip of gauze is passed up into the cavity by the aid of forceps, or by the fingers of the left hand, and

grasped by the fingers of the hand already within the cavity of the uterus, and carried to the fundus; successive portions are thus introduced until the cavity is filled, when the utero-vaginal tamponment is performed as already stated. If properly done this method of arresting uterine hæmorrhage is very efficient, and, with ordinary care, is not attended with any bad results.—*Archives de Tocologie*, Dec. 1890.

LOSS OF CONSCIOUSNESS IN EPILEPSY.

BROWN-SÉQUARD asserts that in epilepsy, as in natural sleep, it is beyond doubt that cerebral anæmia is not the cause of the loss of consciousness, but that it is extremely probable that the cessation of the activity of the brain in sleep, either hypnotic or normal, in *petit mal*, in a well-developed epileptic convulsion, in certain cases of syncope, in asphyxia, and in poisoning, depends upon an inhibitory action upon the base of the encephalon and cervical marrow, without the quantity of blood being diminished in the brain. He has demonstrated this inhibitory action by several experiments upon dogs and other mammals, the mere section of the skin of the neck, which it is necessary to make in order to expose the great sympathetic and its ganglia, being followed by an inhibition of the epileptogenous power of the brain, whilst ablation of the two superior cervical ganglia is followed by the same inhibitory action, the quantity of blood in the brain remaining normal.—*Archives de Physiologie*, January, 1891.

ACTION OF CERTAIN REAGENTS UPON THE CEREBRAL CIRCULATION.

DE BOECK and VERHOOGEN have published some observations upon their studies of the modifications in the cerebral circulation which take place under the influence of certain reagents. Their investigations included the effects produced by carbonic-acid poisoning, and those arising from subcutaneous injections of ether or intravenous injections of morphine, with special reference to their influence upon the general blood-pressure, the force of the cerebral circulation, as shown by the quantity of blood traversing the brain in a given time, and the effect upon the cortex and basal ganglia. These experiments were performed for the most part upon curarized dogs, and consisted in the introduction of a canula, armed with a glass tube, into the external jugular vein after ligation of all the veins emptying into it with the exception of the inferior cerebral, thus securing the escape of all the blood through this channel. By the aid of the kymographion they were enabled to estimate the force and rapidity of the cerebral circulation, and to note any changes arising from the introduction of the poison into the system. The general blood-pressure was taken in the right crural artery. By means of ophthalmoscopic examinations these observers were enabled to note the effects of the substances upon the basal circulation, while the thermo-electric needle recorded any alteration in the cortical temperature as indicative of changes in the circulation there.

A condition of *asphyxia* was produced either by arresting the artificial respiration in the curarized dog, or by compressing the trachea when the animal was breathing naturally. The circulation under these circumstances became more active in every part of the brain, and this augmentation was independent of the changes in the general blood-pressure. An active cerebral congestion was produced, as shown by the ophthalmoscope and thermo-electric needles.

It was found that sulphuric ether injected under the skin of the breast or abdomen slightly raised the general arterial-pressure, and at the same time produced an increase in the flow from the cerebral vessels.

From the experiments upon the action of morphine, it was found that the hydrochlorate administered intravenously weakened the cardiac contractions and dilated the capillaries, but did not alter the cerebral flow. After a single injection the arterial-pressure remained normal during a period of time varying from a few seconds to a half-minute. It then fell abruptly, remaining low for a period of variable duration, and then slowly returned to its normal level. The effects of successive injections became less and less marked, until scarcely any appreciable fall was noticed. Sooner or later, however, according to the susceptibility of the animal, sudden irregularities occurred in the kymographic curve, succeeding one another quickly, or separated by regular tracings. Upon the cerebral circulation the effect was very interesting. The cortex became anæmic, while the base became relatively hyperæmic.

Practically these experiments with morphine are suggestive. From the depressing effect of the drug upon the heart and circulatory system, it is evident that its subcutaneous use is contra-indicated in lesion of the heart and vessels, in atheroma, and in cardiac asthenia. The effects are entirely opposite to those produced by digitalis. Morphine is, therefore, of service where digitalis fails, preëminently in great hypertrophy of the left ventricle, in which it weakens the cardiac contractions, dilates the vessels, and regulates the circulation.

The authors append the following *résumé* of their work:

1. In an artery which divides into two systems or branches, if the capacity of the branches is not approximately proportionate to that of the common trunk, every variation in the resistance to the passage of the blood in one of these networks determines the variations in the flow of the other.

2. This reciprocal dependence of the capillary circuits fed by the same artery is much more marked if the distance between the collateral and terminal networks is great. This rule holds with great force in regard to the cerebral circulation.

3 In poisoning by carbonic acid the blood-pressure rapidly rises, the cerebral flow becomes more abundant, and the circulation of the base and of the cortex becomes more active.

(*a*) Following subcutaneous injections of ether

the blood-pressure slightly rises; the cerebral flow increases little by little; and the blood-supply is more abundant to every part of the organ; but these phenomena are slighter and less evident than those produ ed by asphyxia.

(*b*) Intravenous injections of morphine lower the blood-pressure; the cerebral flow does not undergo modification, but there is anæmia of the cortex with hyperæmia of the base.—*Journal de Médecine*, November 5, 1890.

SOCIETY PROCEEDINGS.

PHILADELPHIA ACADEMY OF SURGERY.

Stated Meeting, December 4, 1890.

J. EWING MEARS, M.D., IN THE CHAIR.

(Concluded from page 83.)

DR. JOHN B. DEAVER read a paper entitled

OPERATIVE TREATMENT OF STRICTURE OF THE MALE URETHRA.

His objects, he said, in reading a paper upon this subject were, first, to present the treatment that he has found most satisfactory and which he believes offers the only means of cure in the great majority of cases as he has demonstrated most satisfactorily to himself; second, to detail some of the consequent conditions, especially those following strictures of large calibre; and third, to provoke discussion, and thus to hear the experience of others.

To make the subject as concise as possible he classified strictures under the following heads: 1st. Strictures of large calibre. 2d. Strictures of small calibre. 3d. Impermeable strictures.

Any of these forms might be the result of disease, which is more common, or of traumatic origin, which is less common. The larger number of the former, in the speaker's experience, are in the pendulous or spongy urethra, from two and one-half to three and one-quarter inches within the meatus; traumatic strictures being almost always of the membranous urethra.

If the stricture is twenty millimetres or more in circumference the diagnosis is best and most accurately made by the urethrometer and urethroscope, and if less than twenty millimetres in circumference with the *bougie à boule* and the urethroscope.

Strictures of large calibre and contractions of the meatus show their ill effects chiefly by reflex troubles of the urinary and sexual apparatus, and cause, first, the simplest of these troubles, namely, retention of a few drops of urine in the urethra after urinating, due to spasmodic contraction of the muscular layer of the urethral wall; second, painful and prolonged erections immediately preceding or following urination; third, a contracted and somewhat hardened condition of the penis due to spasmodic contraction of the muscular fibres embedded in the trabeculæ of the corpora cavernosa; fourth, retention of urine due to spasmodic contraction of the compressor or constrictor urethra muscle—spasmodic stricture (termed urethrismus by Otis) in which in some cases it is not only difficult but may be impossible to introduce an instrument into the bladder, even when the patient is under the influence of an anæsthetic; fifth, cystospasm, and at times associated with it, rectospasm; sixth, chronic urethritis, which can be determined only by a urethroscopic examination; seventh, reflex sensory neuroses, which in too many instances make the patient's life a most miserable one, and to the existence of which every experienced neurologist can bear witness.

Many a patient suffering from a reflex sensory neurosis, caused by a stricture of large calibre or a contracted meatus, describes a train of symptoms which the surgeon, whose advice he seeks, stamps as hypochondriacal, confirmed dyspepsia, neurasthenia, etc., and dismisses as incurable. When such a case passes into the hands of another surgeon, and the cause of the trouble is detected and corrected, the latter gentleman is said, by those who are sceptical upon the subject of reflex neuroses produced in the above-mentioned manner, to have cured the patient by the moral effects of the operative procedure.

Dr. Deaver then read a letter from a former patient of his, a physician in the far West, who came to Philadelphia and placed himself under the care of two prominent surgeons, both of whom are members of the Academy of Surgery. Both surgeons finally told the patient that he was free from any organic trouble, and that it was only necessary for him to exercise the proper amount of will-power, when things would right themselves. The man, before leaving Philadelphia, consulted the speaker, who learned that in early life he had been addicted to the practice of masturbation. He examined the urethra with the urethrometer, and found both a contracted meatus and a stricture of large calibre. He operated, and ten days later the patient went home.

Symptoms of obstruction occasioned by a stricture of large calibre or by a contracted meatus are rarely so pronounced as to induce the patient to seek advice.

The disturbance of the sexual apparatus, brought about by a stricture of large calibre or by a contracted meatus, manifests itself chiefly by impotence, and particularly by the variety known as impotence due to weakness with abdominal irritability. These symptoms are explained by the stricture or contracted meatus exciting reflex irritation of the prostatic urethra; this portion of the urethra being surrounded by the prostate gland, in the superficial as well as the cortical layers of which are extensive nerve plexuses interspersed with ganglia to which belong, among other functions, that of reflexly exciting erections.

The conditions ascribable to strictures of small calibre, and to impermeable strictures, are so familiar that the speaker did not detail them, but simply said that obstruction and its results are what interfere with the entire urinary apparatus of these subjects.

It is the speaker's practice, in dealing with strictures of large calibre, to restore at once the urethral calibre by dilating internal urethrotomy. A contracted meatus is divided with the meatotome. The urethrotome which he uses is that of Otis, with his own modification of the blade. This instrument is as superior to all other urethrotomes as the urethrometer is superior to the bulbous bougie.

The different forms of treatment made use of in stricture include gradual dilatation, continuous dilatation,

rapid dilatation or divulsion, internal urethrotomy, external urethrotomy, and perineal section.

In a paper upon the same subject, published in the *Therapeutic Gazette*, October 15, 1890, the speaker recorded his objections to treatment by gradual, continuous, and rapid dilatation, to divulsion, and to internal urethrotomy with the Civiale urethrotome. Passing the bougie into the bladder, and necessarily over the prostate, when practising dilatation for stricture, the most common seat of which is the pendulous or spongy urethra, is the usual practice, and, he believed, should be most strongly condemned. In cases that he is compelled to treat by gradual dilatation he simply introduces the instrument beyond the stricture, and never further than the bulbo-membranous junction, except in cases of stricture of the membranous urethra, which are very rare. He uses for this purpose a conical steel sound, shorter and less curved than the ordinary sound.

The only proper operations to obtain a radical cure of stricture of the male urethra are, in the speaker's judgment, gradual dilatation, practised only as a preliminary procedure to dilating internal urethrotomy; dilating internal urethrotomy; internal urethrotomy with the Maisonneuve instrument, and external urethrotomy or perineal section. By external urethrotomy he meant an opening made into the urethra from without and anterior to the perineo-scrotal junction, and by perineal section he meant opening the urethra from without but posterior to the same junction.

He wished it clearly understood that he restricts the operation of internal urethrotomy, done either with the dilating urethrotome or with the Maisonneuve instrument, to strictures not further back than four and one-half inches in a penis of medium length, and five inches in a very long penis.

He highly approves of using either a general or local anæsthetic in internal urethrotomies, and gives decided preference to the former, as, other things being equal, he believes that our work is done better when we have the complete control of the patient; and again, we are not as likely to hurry with the operation as we are when using a local anæsthetic, which may entirely anæsthetize the parts, but does not abolish the patient's apprehension, as a result of which he becomes nervous and anxious, soliciting the surgeon to stop before all traces of obstruction are entirely relieved.

The question of urethral antisepsis is very important in connection with the subject of internal urethrotomy. This consists of the administration of boric acid internally for three or four days before operating, and of flushing the urethra for the same length of time from four to six times daily with a 1-to-10,000 or 1-to-15,000 solution of bichloride of mercury. The speaker believes that it is of special importance to introduce an aseptic soft-rubber catheter into the bladder immediately after the operation and to retain it for twenty-four hours. If there is any doubt that the urine is aseptic, it is well to wash out the bladder through the retained catheter with the 1-to-15,000 solution, or, if the operator prefers, with boric acid solution. The strict observance of the foregoing treatment, in addition to thoroughly clean instruments, renders this operation positively free from risks, granting that the operator is familiar with and recognizes any of the contra-indications to the operation.

In strictures of small calibre not deeper than four and one-half inches in a medium-size penis, and five inches in an unusually large penis, he cuts to 20 millimetres with the Maisonneuve instrument, completing the restoration to the normal calibre with the dilating urethrotome.

Strictures of small calibre deeper than five inches he cuts from without, doing either an external urethrotomy or a perineal section, depending upon the location of their stricture.

Impermeable strictures call for either external urethrotomy or perineal section, depending upon their location. Impermeable strictures, when multiple, and also a very long linear stricture, may require both external urethrotomy or perineal section and internal urethrotomy. In some cases it is impossible to pass the filiform bougie of the Maisonneuve urethrotome through the stricture by the way of the meatus after having done an external urethrotomy or perineal section, and in order to complete the operation it is necessary either to prolong the external wound until all of the strictured area is divided, or do an internal urethrotomy. In such cases he has succeeded in passing a very fine-eyed probe through the stricture from behind forward, introducing it by the way of the wound. He has then tied to the probe small knives like those of the Maisonneuve instrument, drawing them after the probe through the urethra and out from the meatus, in this manner cutting the stricture or strictures to 20 millimetres. It then only remains to complete the division with the dilating urethrotome.

Both external urethrotomy and perineal section the speaker performs without a guide, placing more reliance on the recognition of the tissues than upon any mechanical assistance. Some surgeons speak of doing the operation in the above manner as plodding one's way into the urethra. This is certainly a just criticism when applied to a surgeon who is not a surgical anatomist. But even where the perineum is greatly infiltrated he has not experienced any difficulty, as the exposure of the healthy urethra immediately anterior or posterior to the obstruction is the most reliable guide to the diseased portion. Having completed the operation, he not only introduces a drain into the bladder through the wound but also through the urethra, by which means he is able to irrigate the bladder and the urethra separately.

Suprapubic drainage as a preliminary to perineal section or external urethrotomy, in certain cases of stricture of small calibre and of impermeable strictures, may be required owing to the presence of complications rendering immediate perineal section or external urethrotomy inadvisable.

In discussion, DR. MORTON said that after listening to the paper and having before him a great array of instruments, said to be absolutely necessary in the successful treatment of urethral stricture, it would seem either that he was behind the times, or that he has not had under treatment those forms of stricture to which the attention of the Fellows had been called. In his long experience in private and hospital practice, he had never seen a case of stricture which required internal urethrotomy; consequently he has never performed the operation, and yet he is satisfied that his patients have been cured. He recognizes but two forms of stricture, the permeable and the impermeable; the former he can generally dilate,

in the latter he always makes a perineal section. In dilating strictures he invariably uses either graduated steel bougies, or first stretches the stricture with the Wakling tubes, introducing first the smallest silver instrument, when dilatation can be readily and safely effected by the introduction of larger tubes. The subsequent treatment consists in the passage of steel bougies, with the use of which the patient is made familiar.

In those cases of permeable strictures which, although a small instrument can be passed, present great irregularity and rigid walls, he prefers perineal section to dilatation. After perineal section he introduces the short, straight silver tube in the bladder and drains through the wound for a few days, after which a catheter or a steel bougie is daily passed through the entire urethra, gradually increasing the size of the instrument.

DR. HUNT agreed with Dr. Morton, and although he had had no experience with the method suggested by Dr. Deaver, he could claim a fair measure of success. He has discharged such patients, comparatively speaking, well, having taught them to use the instrument themselves; but we all know how careless people are of such matters. He has seen strictures return after external urethrotomy, and thought that he could not give a better report of those treated by dilatation. He has frequently performed the external operation, but very rarely the internal.

DR. PORTER, while he endorsed a great deal that Dr. Deaver had said, could not go so far. He was never partial to internal urethrotomy, his preference being for gradual dilatation with bougies. He believed that we can cure these cases as completely by gradual dilatation as by internal or external urethrotomy. The secret of success is dilatation to the normal calibre of the urethra. He does not like filiform bougies, as it is impossible to tell where the bougie goes. He has seen a filiform bougie apparently pass without difficulty, but when it was withdrawn it was found to be doubled on itself. He uses in preference the finest steel bougie, the position of the handle indicating where the instrument is. He has had as difficult cases as anyone to treat, and has seen no reason to find fault with gradual dilatation. About eighteen months ago a man was brought to his office with an exceedingly tight stricture. His history was that he had only urinated in drops for more than twenty years. The speaker worked with the fine steel bougies for some time, and finally succeeded in passing a No. 2 (French). He allowed this to remain a few seconds, and then followed it by No. 3 and then by No. 5. He then introduced the smallest catheter that he had and emptied the bladder. The patient was told to go to a hotel and to bed. He returned every three or four days and had the instruments passed, and in three months was cured. If we dilate to the normal calibre of the urethra, Dr. Porter does not believe that the stricture will return. He has examined several cases, some years after the cessation of treatment, and, as a rule, there has been no relapse.

He could endorse everything that Dr. Deaver said in regard to nervous troubles from strictures of large calibre but could not agree with him in the methods of treatment. He has never done internal urethrotomy, and external urethrotomy only rarely, for he seldom fails to relieve retention of urine by passing an instrument through the urethra. If he failed to empty the bladder by a catheter, he would aspirate. The latter operation he thinks, is too much neglected. By drawing off the urine in this manner the congestion is relieved, and the probability is that in a few hours an instrument can be passed through the urethra.

DR. COLLINS said that he had practised both methods, but chiefly relies upon bougies, and, after passing the large sizes, he has had complete success. He has used Gouley's catheters and filiform bougies, and has often been successful with them. In some cases he has performed internal urethrotomy. He fully agrees with Dr. Deaver in regard to the absolute necessity of relieving strictures of large calibre, but he is not prepared to say which of the proposed operations is the best. His plan is to begin with one method, and if that fails try others, and if he then fails, to aspirate.

DR. ROBERTS thought that there were one or two points that had not been thoroughly brought out in the discussion. The patients referred to by Dr. Morton and Dr. Hunt belong to the poorer class that comes to a general hospital for relief. These patients, if they secure a fairly-good stream of urine, are delighted, but such a result would not be sufficient for a man in the higher walks of life. It seemed to him that we should take the difference between these two classes of cases into consideration. He doubted whether Dr. Morton or Dr. Hunt followed this commoner class of cases sufficiently closely to say whether the strictures return and whether the necessity for the use of the bougie for several years is not a disadvantage.

The speaker said that he sees a comparatively small number of cases of stricture, but he almost always gets good results with gradual dilatation. He finds filiform bougies very useful, and has frequently succeeded in passing a filiform instrument after failing with a solid bougie. If, in a case of retention, he succeeds in introducing a filiform bougie, he is willing to leave the case temporarily, for there will be an escape of a certain amount of urine along the bougie which will relieve the distention of the bladder.

He would like to hear from Dr. Deaver whether, after the cutting method, it is necessary to continue dilatation for a long time.

DR. J. HENRY C. SIMES thought that the discussion was a little "mixed up" in reference to the "cure" of stricture. He does not believe in the cure of stricture. It is an anatomical impossibility to restore the urethra to its normal condition after a stricture has formed. There is, however, no doubt that we relieve the case decidedly; how the relief is obtained is immaterial to the patient. He thinks that the result depends largely upon the patient; if the subject makes no complaint we must consider him relieved. Therefore we find great differences. In highly-nervous patients the speaker has sometimes been obliged to resort to something more than dilatation. He has done internal urethrotomy in some cases, but has also been compelled to continue the dilatation. He has seen strictures return after both internal urethrotomy and after dilatation; therefore, he said, we do not cure the stricture. He begins the treatment with the method which, in his experience, offers the least risk—that is, dilatation—and continues it as long as necessary. If that relieves the

symptoms, he considers the case cured for the time being; if it does not give relief, he resorts to internal urethrotomy, and follows it by dilatation.

He considers filiform bougies of great service, and does not think that a steel instrument smaller than No. 10 or No. 8 French is a safe instrument to use in the pathologically-changed urethra. No. 6 or No. 4 is almost a cutting instrument, and in a diseased urethra there is great danger of making a false passage. With a filiform bougie there is very little danger, and he has succeeded in introducing one after failing with other instruments.

DR. DEAVER, in closing, said that he could not understand how an advanced surgeon at the present day could take the ground that had been taken by some of the Fellows in this discussion. In regard to evil results from internal urethrotomy, he has operated on about fifty cases, and has not seen the slightest complication. Dr. Otis reported at one time one thousand cases of internal urethrotomy without a death, and practically without a complication. The only complication that the speaker has seen is curvature of the penis from inflammatory deposit, which was entirely relieved by the absorption of the deposit.

He considers such instruments as Wakling's tubes relics of barbaric surgery. The instruments may split and bruise the urethra, causing much more serious damage than does the small incision made by the urethrotome. If surgeons would make urethroscopic examinations after dilatation they would find that it leaves conditions which could not be produced by the urethrotome. In one case, which he demonstrated to the class at the Philadelphia Hospital, the dilatation left a polypoid mass at the seat of stricture.

In order to be sure that a case is cured the urethra should be measured some time later. He then asked how many of the gentlemen had done this, to which Dr. Porter replied that he had done it often.

Dr. Deaver then said that when the *bougie à boulé* is used we cannot be sure of the results. Accurate results can be obtained only by the use of the urethrometer.

He uses filiform bougies if he cannot get the consent of the patient to do an external urethrotomy. He was glad to hear Dr. Morton say that in impermeable strictures he would resort to external urethrotomy. He does not feel at ease, as does Dr. Roberts, when he has passed a filiform bougie through a very tight stricture with the object of allowing it to remain, as it has a tendency to set up inflammation and ulceration of the walls of the urethra. As Dr. Roberts said, some patients are satisfied even if the result is not perfect, but the cases reported by the speaker occurred among the better class of patients—patients who are not satisfied until they are perfectly cured.

He is not in favor of the plan of trying for a long time to pass an instrument through the urethra. We would not follow a similar plan in strangulated hernia. The patient may have cystic kidneys, and he thinks that it is just as bad to prolong operative interference in retention of urine as it is in strangulated hernia. Aspiration had been referred to, but this is merely a temporary expedient, and the stricture will subsequently require treatment; it may be by internal or by external urethrotomy.

The great objection to gradual dilatation is that the instrument is passed into the bladder and bruises the sensitive prostate gland, and he believes that this is one of the most common causes of prostatorrhœa. He did not claim that after internal urethrotomy we may not have to pass an instrument, but four or five weeks is sufficiently long to use a bougie. He added that some strictures are never cured, but he is sure that many can be cured. The operation of dilatation is much more liable to be followed by contraction than is that of dilating internal urethrotomy, which makes only a slight incision. The lips of the incision are not allowed to come in apposition, and it heals by granulation, leaving a cicatrix, which can be discovered only by careful examination. After dilatation the scar is readily seen.

CORRESPONDENCE.

CHICAGO.

To the Editor of THE MEDICAL NEWS,

SIR: At a recent meeting of the Chicago Medico-Legal Society a resolution was adopted to the effect that public *séances* of hypnotism, mesmerism, and magnetism should be prohibited by law, and that hypnotism for medical purposes should be practised solely by duly-qualified medical men, and only in the presence of other medical men or undoubted friends of the patient operated upon. Drs. M. H. Lackersteen, Archibald Church, and J. C. Henry were appointed to present the resolution to the Legislature.

There is a rumor that diphtheria is epidemic in Chicago, but the facts at hand do not seem to substantiate the rumor. Reports from the Health Office show a decrease in the number of deaths from diphtheria as compared with the corresponding period of last year. Added to this are the statements made by many prominent physicians, who, in nearly every case, declare that there is no cause for alarm over the spread of diphtheria or other zymotic diseases. In November, 1890, there were 288 deaths from zymotic diseases, of which number 78 were due to diphtheria, 46 to croup, 67 to typhoid fever, and 13 to scarlet fever. In November, 1889, there were 355 deaths from zymotic diseases. Of these, 125 were from diphtheria, 62 from croup, 68 from typhoid fever, and 11 from scarlet fever. The total death-rate for the month of November, 1889, was 1504, and for November, 1890, 1480, showing a decrease in the general mortality as well as in that of zymotic diseases.

The work of the Woman's Hospital is steadily increasing. Notwithstanding the heavy blow dealt the institution by the death of the president of the medical staff, Dr. William H. Byford, the number of patients treated was greater than during any previous year. The medical department has a capacity of only 43 beds. Not less than 22 have been occupied at any time, and often 40 are filled. The whole number of days' service rendered by the hospital during the year was 11,315, of which 36 per cent. was charitable. The total receipts for the year were $18,416.19; disbursements, $18,385.83.

Dr. D. Mills Tucker, who had been a practising physician in this city for thirty-five years, died at his home on December 10th. He was exposed to cold

while attending a patient, developed acute pneumonia, and died in a few hours. He was born in Worcester County, Mass., in 1819, and was graduated from the Medical Department of Harvard University in 1852 He came to Chicago in 1856, and began to practise when the city was little more than a straggling village. He was one of the first physicians to interest himself in the cure of inebriates, and was medical adviser of the Washingtonian Home during the early days of that institution.

Dr. Thomas A. Clark, while treating a patient in his office, December 8th, was suddenly stricken with apoplexy, and died a few minutes later. He was born on a farm near Louisville in 1825, and was graduated from the Kentucky School of Medicine in 1852. From Louisville he went to Jefferson, Ind., and practised there until 1855, when he came to Chicago. For thirty years he was eminently successful as a physician and surgeon, his specialty being obstetrics.

At a meeting of the Public Service Committee, Dr. J. R. Brandt offered a resolution to the effect that no physician should be allowed to act at county institutions as attendant surgeon or physician who has not previously had a practical experience of five years, or who has not served the full term as an interne at the county hospital. The resolution was referred. Dr. Brandt wanted the office of county physician abolished, as he thought the work could be done for $350 per annum. He thought the office was a sinecure, as the coroner had a physician who made all the post-mortem examinations.

NEWS ITEMS.

The Mattison Prize.—With the object of advancing scientific study and settling a mooted question, Dr. J. C. Mattison, of Brooklyn, offers a prize of $400 for the best paper on "Opium Addiction as Related to Renal Disease," based upon these queries:

"Will the habitual use of opium, in any form, produce organic renal disease?

"If so, what lesion is most likely to occur?

"What is the rationale?"

The contest is to be open for two years from December 1, 1890, to either sex, and any school or language.

The prize paper is to belong to the American Association for the Cure of Inebriety, and will be published in the *New York Medical Journal*, *Brooklyn Medical Journal*, and *Journal of Inebriety*.

Other papers presented are to be published in some leading medical journal, as their authors may select.

All papers are to be in possession of the Chairman of Award Committee on or before January 1, 1893.

The Committee of Award will consist of Dr. Alfred L. Loomis, President of the New York Academy of Medicine, Chairman; Drs. H. F. Formad, Philadelphia; Ezra H. Wilson, Brooklyn; George F. Shrady, and Joseph H. Raymond, editor of the *Brooklyn Medical Journal*.

The Swatow Mission Hospital.—The largest of the mission hospitals in China is that of Swatow. The number of in-patients treated during the past year was 2679. There were 3151 out-patients, a relatively small number. The expenses were $2275. More than 250 cases of leprosy applied for treatment, to which only palliative treatment could be given. Surgical measures were required in about twenty per cent. of all cases.

Corrigendum.

THE TREATMENT OF FAILING CIRCULATION.

In the article on the "Treatment of Failing Circulation," by Dr. C. S. Bradfute (THE MEDICAL NEWS, January 3, 1891), line 18 from the bottom of the second column, page 16, should read "in the course of *typhoid* fever."

OFFICIAL LIST OF CHANGES IN THE STATIONS AND DUTIES OF OFFICERS SERVING IN THE MEDICAL DEPARTMENT, U. S. ARMY, FROM JANUARY 13 TO JANUARY 19, 1891.

By direction of the Secretary of War, HENRY D. SNYDER, *First Lieutenant and Assistant Surgeon*, is relieved from duty at Fort Reno, Oklahoma Territory, and will report in person to the commanding officer Camp Guthrie, Oklahoma Territory, for duty at that station, relieving John L. Phillips, Captain and Assistant Surgeon. Captain Phillips, on being relieved, will report in person to the commanding officer Fort Reno, Oklahoma Territory, for duty at that station.—Par. 16, *S. O. 11, A. G. O., Washington, D. C.*, January 14, 1891.

PROMOTIONS.

To be Assistant Surgeon, with the rank of Captain, after five years' service, in accordance with the Act of June 23, 1874:

HARRIS, HENRY S. T., *Assistant Surgeon*, January 5, 1891.

WOOD, LEONARD, *Assistant Surgeon*, January 5, 1891.—*A. G. O., Washington. D. C.*, January 12, 1891,

OFFICIAL LIST OF CHANGES IN THE STATIONS AND DUTIES OF THE MEDICAL CORPS OF THE U. S. NAVY FOR THE WEEK ENDING JANUARY 17, 1891.

HORD, W. T., *Medical Director.*—Ordered, as President of the Medical Board, to relieve Medical Director J. Y Taylor.

DEAN, R. C., *Medical Director.*—Detached from Hospital, Chelsea, and ordered to the Medical Board, Washington, D. C.

TAYLOR, J. Y., *Medical Director.*—To be placed on the Retired List, January 22, 1891.

RUSH, W. H., *Passed Assistant Surgeon.*—Orders to the U. S. S. "Newark" are revoked.

ASHBRIDGE, RICHARD, *Passed Assistant Surgeon.*—Orders to the U. S. S. "Saratoga" revoked, and to await orders.

CABELL, A. G., *Passed Assistant Surgeon.*—Detached from Iron Clads and ordered to the U. S. S. "Newark."

LUMSDEN, G. P., *Passed Assistant Surgeon.*—Ordered to the Iron Clads at Richmond, Va.

COMMUNICATIONS are invited from all parts of the world. Original articles contributed exclusively to THE MEDICAL NEWS will be liberally paid for upon publication, or 250 reprints will be furnished instead of payment, provided request for reprints be noted by author at top of manuscript. When necessary to elucidate the text, illustrations will be provided without cost to the author.

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